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N O T I C E . . .

An analysis of the benefits to American agriculture from the new trade agreement with Czechoslovakia will appear as a supplement to the March 26 issue of Foreign Crops and Markets. Copies may be obtained by writing to the Bureau of Agricultural Economics, Department of Agriculture, Washington, D. C.

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TRENDS AND POSSIBILITIES OF COTTON PRODUCTION IN CHINA . . .

By Fred J. Rossiter*

China is the third most important cotton-producing country, being exceeded only by the United States and India. Cotton production in China has increased more than a million bales during the past 5 years. This recent expansion has become an important factor in reducing the demand for American and other growths, which China had been consuming largely in the form of imported cloth. The total amount of cotton piece goods, yarn, and raw cotton imported annually into China from 1900 to 1932 averaged the equivalent of more than 1,250,000 bales of raw cotton. 1/ During the past 2 years, imports into China of cotton goods and raw cotton have almost ceased.

It is important to ascertain what brought about this increase in production and to see what the possibilities are as to further expansion. Is it possible for cotton production in China to increase beyond domestic needs and compete with other cotton on the world market?

During the past 15 years, China's raw-cotton consumption has totaled about 3.5 million bales annually. The Chinese cotton crop in 1936 was placed at 3,870,000 bales. An early estimate of the 1937 production was 4,400,000 bales, but this estimate is expected to be revised downward materially, possibly to as low as 3,600,000 bales, as a result of excessive, late rains and military activities in some of the important producing districts. Thus, China's production is already slightly in excess of domestic needs. Furthermore, in most producing sections in China, cotton is still a minor crop. Soil and climatic conditions in many parts are suitable for cotton growing; and, with abundance of labor and other favorable economic factors, and a continuation of cotton improvement work, it is possible for cotton production to be increased considerably.

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*Agricultural Economist, Bureau of Agricultural Economics.

1/ Bales of 478 pounds net are used in this Article.

Historical Background

China has been producing cotton for centuries. In an old Chinese classic written about 2205 B.C., mention is made of cotton as having been used in the manufacture of cloth and given as tribute to the rulers of the "Middle Kingdom." 2/

During the last half of the eighteenth century, records of shipping companies indicate that China was exporting cotton piece goods to Europe and America, so that China at that time evidently had a supply of raw cotton in excess of domestic requirements. By about 1800, however, a small amount of raw cotton was imported annually, which possibly offset the piece goods exported at that time. After 1820 and during the remainder of the nineteenth century, China was deficient in the supply of raw cotton, as total imports of cotton goods and raw cotton exceed exports. Cotton production evidently did not keep pace with the demand during this period when the population was increasing rapidly.

Foreign trade statistics for China indicate that imports of cotton piece goods and yarn in 1900 amounted to the equivalent of 1 million bales of raw cotton. Since the Chinese population at that time was estimated at 400 million, China must, in addition, have been producing at least 1.5 million bales of raw cotton to clothe this number of people.

Rapid Increase in Production Since 1932

Estimates of Chinese cotton acreage and production are available since 1920. These estimates, though perhaps somewhat incomplete for the earlier years, are continuous and give some indication of the trend. Without census data or land surveys, it is impossible to obtain accurate data. But the figures for the important producing Provinces are believed to be fairly reliable.

Information available concerning the amount of Chinese raw cotton consumed by the modern spinning mills in China and the amount of raw cotton exported serves as a guide for production estimates. A large quantity of cotton is known to be used in home consumption, but accurate statistics are lacking. The severe winters and shortage of fuel north of the Yangtze River have given rise to the utilization of considerable raw cotton in padded winter garments and in so-called padded blankets. Raw cotton is still used for home spinning in the more remote sections of China.

2/ Fong, H. D., Cotton Industry and Trade in China, the Chihli Press, Inc., Tientsin, China, August 1932, p. 1.

COTTON: PRODUCTION, ACREAGE, AND YIELD, CHINA, 1920-21 TO DATE

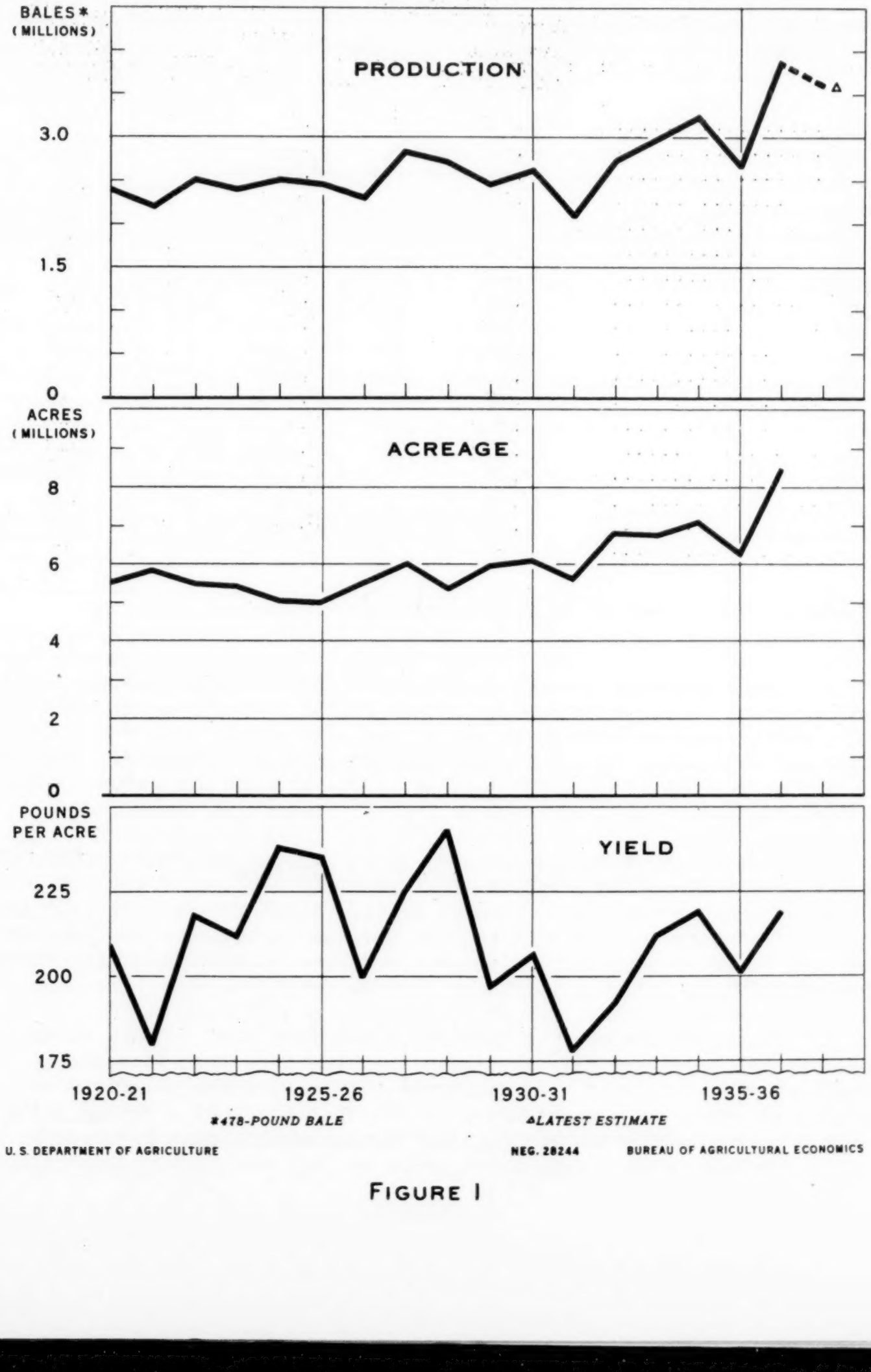

FIGURE 1

Table 1. Chinese cotton acreage, production, and yield, 1920-1937

Year	Acreage harvested	Production	Yield per acre
	1,000 acres	1,000 bales	Pounds
1920	5,500	2,400	209
1921	5,830	2,200	180
1922	5,500	3,510	218
1923	5,425	2,400	212
1924	5,040	2,510	238
1925	5,000	2,460	235
1926	5,500	2,300	200
1927	6,000	2,824	225
1928	5,350	2,720	243
1929	5,960	2,458	197
1930	6,070	2,615	206
1931	5,620	2,093	178
1932	6,770	2,720	192
1933	6,720	3,980	212
1934	7,080	3,243	219
1935	6,250	2,667	204
1936	8,450	3,870	219
1937	-	a/ 3,500	-

Shanghai office, Bureau of Agricultural Economics.
a/ Preliminary.

China's cotton acreage from 1920 to 1931 averaged about 5.5 million acres, equal to about 15 percent of the United States acreage. During this period Chinese acreage showed no definite trend; but, beginning in 1932 and continuing into 1937, the acreage rapidly increased. Last year it was equivalent to about 25 percent of the acreage harvested in the United States.

Production of Chinese cotton, which fluctuated around 2,400,000 bales from 1920 to 1931, was equal to about 55 percent of the Indian crop for this period and 20 percent of the United States harvest. As a result of increased production, the Chinese harvest for the year 1936 equaled 70 percent of the Indian crop and over 30 percent of the United States harvest.

The yield per acre of Chinese cotton from 1920 to date shows no definite trend and only a slight variation from year to year, as compared with yields of most countries. This relative stability in yields is partially accounted for by the fact that, if a cotton field gets a poor start in the spring, the farmer usually puts in a catch

crop in place of the cotton; whereas, if a crop gets a fairly good start, the summer weather is generally favorable for producing at least an average harvest. Furthermore, the Chinese farmer seldom experiences disastrous diseases or insect infestation, at least not on as large a scale as in some countries. 3/

Table 2. Chinese cotton acreage and production, by Provinces, 1936

Province	Acreage	Production	Province	Acreage	Production
	1,000 acres	1,000 bales		1,000 acres	1,000 bales
Hopei.....	1,584	687	Anhwei.....	213	140
Shantung.....	928	484	Kiangsi.....	34	11
Shansi.....	315	134	Hupeh.....	1,349	722
Honan.....	921	370	Hunan.....	112	70
Shensi.....	646	254	Others.....	592	155
Kiangsu.....	1,579	656			
Chekiang.....	361	231	Total.....	8,534	3,914

China Cotton Statistics Association. These estimates differ slightly from those in table 1, which are from a different source.

The yield per acre in China, as a result of intensive culture, averages higher than in the United States. The mature cotton plants are smaller in size than those in this country, but they are planted much closer together and, in addition, the crop is picked every few days, with the result that there is little loss in harvesting.

Major Producing Regions

China has two rather distinct cotton-producing regions - the Yangtze Valley and North China. In addition, there are small producing districts between these two main regions and also a number of districts growing a small amount of cotton scattered over other parts of China. See figure 2. In the two principal producing regions, the basic factors affecting cotton production, such as climate, soils, and cropping systems, are materially different. Weather conditions that are favorable in one region are often unfavorable in the other. In the Yangtze Valley, cotton and a second crop are regularly produced on the same land each year. In North China, when cotton is grown, only one crop is raised per year. The recent expansion in cotton acreage has taken place largely in the North China region.

3/ Many observations in this article are based on field investigations made by the writer from 1931 to 1936, while stationed at Shanghai.

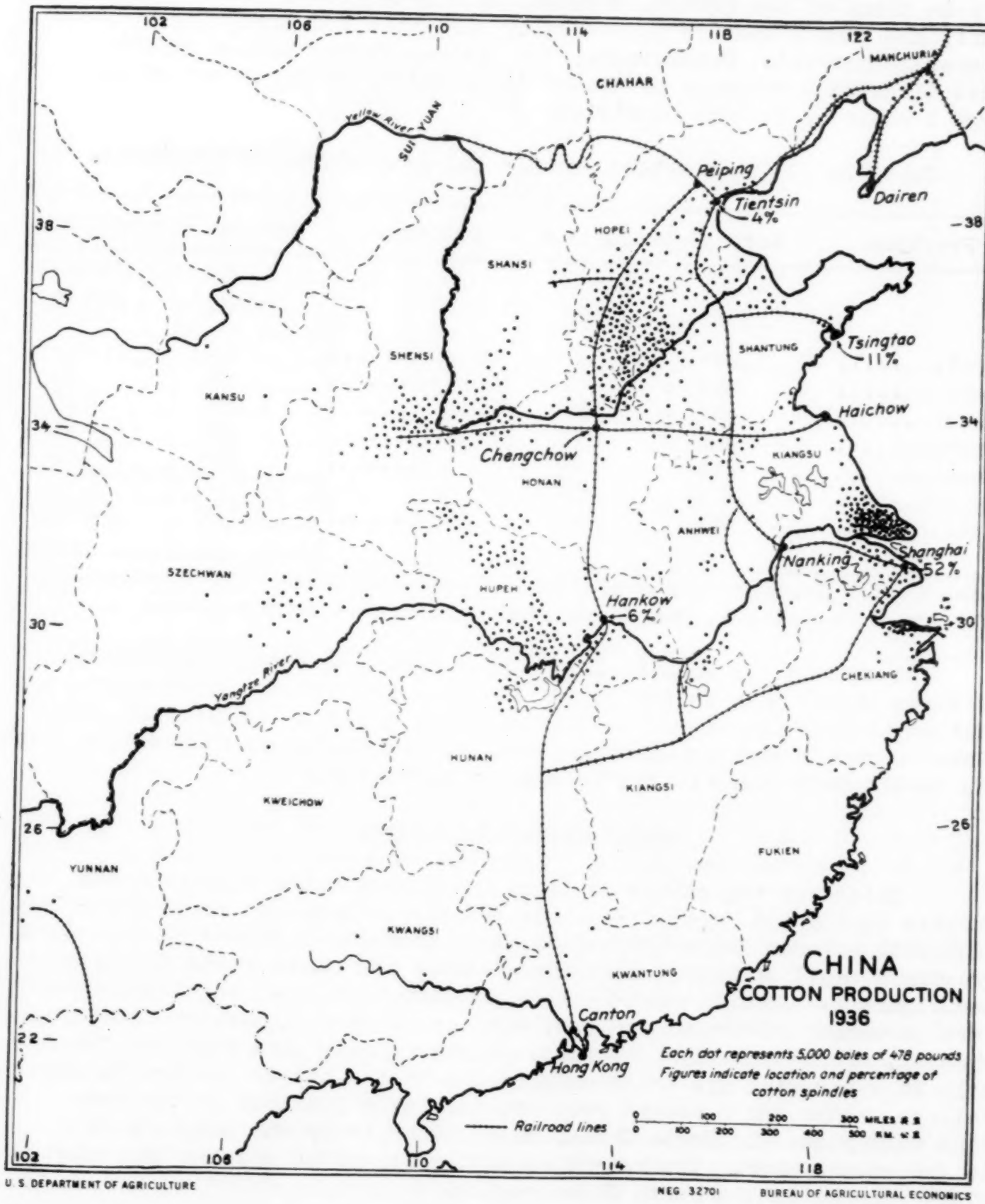

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FIGURE 2

Yangtze Valley

The Yangtze Valley, which is in about the same latitude as southern Georgia, has been an important cotton-producing region for a long time. Two decades ago, this region furnished a large supply of commercial cotton. Of the 34 cotton-spinning mills in operation in China at that time, all but two were located in the Yangtze Valley.

The most intensive cotton-growing area is found along the Yangtze River in the Nantungchow district of Kiangsu Province. This Province has for many years been the leading producer of cotton. Cotton growing is also fairly extensive on the south bank of the Yangtze River and surrounding the city of Shanghai.

The second most important cotton-producing area in the Yangtze Valley is west and northwest of Hankow in Hupeh Province.

In Chekiang Province, along the south bank of Hangchow Bay, is a small area where production is intensive. Cotton produced in this section matures earlier than elsewhere in China and usually reaches the Shanghai market about the first of September.

A few cotton-producing districts are located in Anhwei, Kiangsi, Hunan, and Szechwan Provinces, but these sections supply only a small part of the commercial staple consumed in the modern spinning mills. A marked expansion in cotton acreage has taken place in recent years in northern Hunan.

North China

The North China cotton region is in about the same latitude as North Carolina and the southern half of Virginia. Production in this region is heavily concentrated in the Yellow River Valley. The heaviest producing area is in southern Hopei, northwest Shantung, and northern Honan Provinces. Another important cotton-growing area in the Yellow River Valley is in northwest Honan, southern Shansi, and eastern Shensi. China's longest staple comes from this area, and during the past few years a considerable expansion in acreage has taken place in Shensi Province.

Minor producing areas in the North China region are north-central Shantung Province and the Tientsin area. These two districts are of particular importance, as the recent expansion has consisted largely of improved staple.

Manchuria

Some consideration should be given to Manchuria because of the recent efforts to increase production in this area. Climate, soil, and

cropping conditions are somewhat different from those in North China. The soil is more fertile, the growing season shorter, and rainfall somewhat more certain than in North China. In general, only one crop is grown in Manchuria per year. Manchuria has been growing native types of cotton for many years and producing approximately 40,000 to 50,000 bales each year. As a result of a great deal of effort by the new government in Manchuria to increase production and improve the staple, the cotton crop has been increased to approximately 90,000 bales. Government officials plan to increase production within 15 years to approximately 400,000 bales. Private concerns, however, have lost interest in Manchuria as a supplier of raw cotton because production has increased so slowly, despite the heavy investments already made.

Physical Factors Affecting Production

As far as physical factors, such as rainfall, temperature, and soil, are concerned, China appears to be well adapted to cotton production. Most of the sections in the Yangtze Valley region are suitable for cotton growing, and in North China the temperature and soil are fairly well adapted, although rainfall is somewhat uncertain.

Much of the total area in China is mountainous, but practically all of the cotton is produced at an altitude of less than 500 feet. The only exceptions are small acreages in South China, Yunnan Province, and part of the acreage in Szechwan Province. In some sections of the Yangtze Valley and in North China, cotton is grown on lowlands, which are usually flooded in years of excessive rainfall.

Climate and soil generally favorable

The amount of rainfall in the Yangtze Valley corresponds with that of the eastern Cotton Belt of the United States. The annual amount averages 45 to 50 inches and is well distributed seasonally for cotton production. While the average annual distribution appears nearly ideal, the year to year distribution is irregular.

Excessive rainfall and droughts frequently damage the cotton crop in some of the important areas in the Yangtze Valley region. Too much rainfall damages the crop on the low-lying fields where poor drainage exists. On the other hand, a dry period exceeding 2 or 3 weeks during the summer months seriously injures the cotton plants, as the temperature is usually high and the moisture is not retained so long as in some countries because of the lack of organic matter in the soil. In several sections, however, farmers irrigate their fields by pumping water from streams or canals when rainfall is deficient. In the Yangtze delta, typhoons (severe winds and rainstorms) occur in some years and cause considerable damage to the cotton crop.

Table 3. Rainfall in cotton regions of China

Month	Yangtze Valley		North China		
	Shanghai 53-year average	Hankow 44-year average	Tientsin 35-year average	Taming 17-year average	Shanchow 6-year average
	Inches	Inches	Inches	Inches	Inches
January	2.0	1.8	0.2	0.4	0.2
February	2.4	1.9	0.1	0.3	0.1
March	3.4	3.8	0.4	0.5	0.6
April	3.7	6.0	0.7	0.5	0.8
May	3.6	6.5	1.1	0.8	2.2
June	7.4	9.6	2.5	2.4	2.2
July	5.9	7.1	6.9	5.2	4.1
August	5.7	3.8	5.2	5.6	4.0
September	4.7	2.8	1.9	3.1	2.6
October	3.1	3.2	0.6	0.5	1.1
November	2.0	1.9	0.4	0.4	0.2
December	2.5	1.1	0.1	0.2	0.2
Total	46.4	49.5	20.1	19.9	18.3
Highest	62.5	82.9	31.3	34.1	26.5
Lowest	27.9	22.8	10.0	9.9	7.8

Chapman, E. Burgoyne, The Climatic Regions of China, University of Nanking, Bulletin No. 3, 1933.

In the North China cotton region, the annual rainfall amounts to about 20 inches as compared with about 30 inches for central Texas. Although the annual precipitation is low, the average distribution is quite well suited for cotton growing, approximately 70 percent occurring during June, July, and August. While the average annual distribution is satisfactory, the year to year uncertainty in this region is a very important factor in determining the cotton acreage in any particular year. Most areas of North China are subject to the possibility of insufficient moisture in April and May, and often the summer rains do not come until the middle of July. Under such conditions, cotton acreage is materially reduced. Such a reduction occurred in 1935, when the intentions to plant pointed to an acreage above that of the preceding year but, as a result of the dry weather during May and June, the actual acreage was substantially lower. On the other hand, July and August rains are sometimes excessive and result in floods, which damage the crop in some localities.

Well irrigation, which was promoted by the China International Famine Relief Commission about 16 years ago, has become quite common in many districts in Hopei and has developed to some extent in other Provinces in North China. A farmer having a good well is usually able to obtain a satisfactory cotton crop each year. In a few districts

approximately 50 percent of the farmers have wells, but in a great many sections only a few wells have been dug. Many farmers in North China lack sufficient capital for digging a well, the average cost of which is estimated to be around $50.

Temperature in the Yangtze Valley and North China regions is amply warm, and the growing season is sufficiently long in most sections to insure suitable cotton production. In all sections of China the cotton plants, in general, cease growing and dry up during the last half of September, variable weather having but little effect.

Table 4. Temperature in cotton regions
(Fahrenheit)

Month	Yangtze Valley		North China		
	Shanghai 44-year average	Hankow 29 year average	Tientsin 10-year average	Taming 4-year average	Sian 8-year average
	Degrees	Degrees	Degrees	Degrees	Degrees
January	38	40	25	28	33
February	39	43	29	33	39
March	46	50	40	42	50
April	56	62	55	58	63
May	66	71	67	71	75
June	73	80	75	78	83
July	80	85	79	84	86
August	80	85	79	82	82
September	73	77	69	71	72
October	63	67	58	61	63
November	52	55	40	44	44
December	42	45	27	33	36
Average date of					
Last frost	Mar.15	Feb. 23	Mar. 31	Mar. 25	Mar. 10
First frost	Nov. 22	Dec. 17	Nov. 5	Nov. 8	Nov. 19

Chapman, B. Burgoyne, The Climatic Regions of China, University of Nanking, Bulletin No. 3, 1933.

The temperature in the Yangtze Valley is very similar to that in southern Georgia though the spring months are slightly cooler. In central China, however, summer months are somewhat warmer and winters are colder in comparison with seasons in the same latitude in the United States. The average period free from frost in the Yangtze Valley is over 250 days, or slightly longer than in southern Georgia.

In North China, the temperature in the spring months is similar to that of North Carolina and Virginia. The summer months in North China, especially inland from the coast, are warmer and the winters

colder in comparison with these States. Contrary to general opinion, the season free from frost in North China is not too short for cotton production. It averages about 225 days, or nearly the same as in North Carolina and Virginia. It is true that the lack of sufficient moisture in the early summer months often retards the growth of the cotton plants. Furthermore, imported American cotton seed, before becoming acclimatized, often fails to ripen.

Chinese cotton is produced on soils largely of alluvial deposits, which have a good mechanical texture but are low in fertility and organic matter. In both of the major producing regions, the crop is grown on what is considered good farm land. The production of most of the cotton on alluvial soils is further evidence that the crop is raised largely at a low altitude.

In the Yangtze Valley, the soils are principally of a gray alluvial type, especially those west of Hankow and near Shanghai. In the Yangtze delta along the seacoast are saline alluvial deposits where the heavy cotton-producing section of Nantungchow is located. This type of soil is found also in the cotton district on the south bank of Hangchow Bay in Chekiang Province. Most soils in the cotton sections of the Yangtze are acid.

The principal soil of the North China cotton-producing region is a brown calcareous alluvial deposit found in central and southern Hopei, northern and western Shantung, and northern Honan. This type of soil has been washed down by the Yellow River from the loess deposits of the west. In northwest Honan, Shansi, and Shensi Provinces, cotton is grown on a chestnut loess soil. The loess deposits are fairly deep, with the result that most of the cotton produced in this section is grown on land with a slight elevation. In the Tientsin area, most of the cotton is produced on a saline alluvial type of soil.

Cultural practices

Cotton planting and harvesting in the two major producing regions occur at approximately the same dates. Planting is usually begun about the first of May, although wet weather in some localities in the Yangtze Valley and the lack of moisture in North China may make later planting necessary. It is possible to plant cotton up to the end of May. If moisture conditions are not suitable by that time, some other crop is eventually planted.

In many sections of the Yangtze Valley cotton seed is commonly broadcast in the wheat or barley crop. When the grain crop is harvested the last of May or the first of June, the young cotton plants are from 1 to 3 inches high. In North China, the cotton fields are spring-plowed and harrowed and the seed is planted by hand in rows. The principal

cultivation in both regions is hoeing by hand. Well irrigation in North China requires considerable work. The water from the wells is brought up by small containers attached to an endless chain, which is operated by a power wheel pulled by a donkey, horse, or cow. A number of farmers, however, pull the water up by means of a hand windlass.

Various kinds of fertilizers are used for the cotton crop. The Chinese have a saying, "If seeds are planted, feed must be provided for the young plants." Barnyard manure, canal and pond mud, ashes, and, to a limited extent, vegetable oilseed cakes are some of the common fertilizers used. The oilseed cakes, however, are used more extensively for rice and wheat, which generally give a higher return per acre.

Picking the cotton crop in China is work at which all members of the family lend a hand. Several pickings are made during the season, but fully 70 percent of the crop is harvested during the month of September. In Chekiang Province, where cotton matures the earliest, the first picking begins about the middle of August. Late pickings in North China end in early October.

Economic Factors Limit Cotton Acreage

Though physical factors are reasonably favorable to cotton production in China, economic factors account for the fact that only a small percentage of the cultivated land in China is today producing cotton.

The density of population is estimated at about 1,560 people per square mile of cultivated land as compared with 200 in the United States. This fact makes it necessary for the Chinese people to use a very large percentage of their land for producing food for human consumption. Even in the heaviest cotton-producing section, Nantungchow, it is estimated that on an average only 33 percent of the land is in cotton. No estimates are available to indicate the amount of cultivated land in the two major cotton regions that is used for cotton production, but crop estimates would indicate it to be less than 5 percent. This compares with over 40 percent of the cropland in the nine Cotton Belt States of the United States. Approximately 90 percent of the cultivated land in China is used for producing food for human consumption, and small percentages are in tobacco, hemp, ramie, mulberry trees, etc. No cultivable land is left in hay or pasture, nor is any used for producing feed for livestock.

In land utilization, cotton occupies a minor place in both producing regions. In the Yangtze Valley, two separate crops are produced on most of the land each year. Cotton is grown in competition with other summer crops, such as rice and soybeans. Winter wheat is the most important winter crop, while barley, broad beans, rapeseed, and

peas are also grown extensively during the winter season. Rice is considered the most profitable crop. Some farmers, however, raise cotton or beans, since rice is more expensive to produce in that it requires much greater amounts of labor and fertilizer.

In North China, about 50 percent of the land is in winter wheat each year. The other half is fallowed during the winter and in the spring such crops as kaoliang (grain sorghum), millet, and cotton are planted. Kaoliang and millet are harvested in time for seeding winter wheat, but in this region cotton requires the entire season. Summer crops, such as soybeans, millet, peanuts, sweet potatoes, and corn, are planted after the winter wheat is harvested. Cotton, in some sections, is grown on the same land each year, but it is more common in a 2- or 3-year rotation.

The amount of cotton planted each year depends not only on climatic conditions but also, to a certain extent, on the price of cotton in comparison with other crops. When food prices are high in relation to cotton, or vice versa, it is believed the Chinese farmer makes a shift in the crops planted. Available information giving acreages of various crops from year to year is not sufficient to judge the extent of the shifts in plantings caused by changes in farm-price relationships. Agricultural prices at Shanghai, according to table 5, indicate that in the autumns of 1935 and 1936, raw-cotton prices were more favorable than those of rice and peanuts, compared with prices of previous years. Whether there was a decrease in the acreage of rice and peanuts the following year is not known, but estimates of cotton acreage for China show large increases in 1936 and 1937.

Table 5. Agricultural prices at Shanghai, 1930-1936

Date	Chinese dollars per 100 pounds				United States dollars per 100 pounds			
	Raw cotton	Rice	Soy-beans	Pea-nuts	Raw cotton	Rice	Soy-beans	Pea-nuts
November								
1930.....	36.19	8.50	4.54	7.86	10.09	2.37	1.27	2.19
1931.....	36.19	7.13	3.41	7.82	8.99	1.77	0.85	1.94
1932.....	33.17	5.12	4.41	5.61	6.99	1.08	0.93	1.18
1933.....	24.34	4.56	2.98	4.43	7.94	1.49	0.97	1.44
1934.....	31.75	7.51	4.72	4.08	10.64	2.52	1.58	1.37
1935.....	33.57	6.70	5.08	5.62	9.90	1.98	1.50	1.66
1936.....	39.01	5.66	4.99	5.90	11.51	1.67	1.47	1.74

Shanghai office, Bureau of Agricultural Economics, and Shanghai Monthly Prices and Price Indices.

In spite of good prices for cash crops such as cotton, the Chinese farmer's first goal is to produce sufficient food for himself and his family. Most farmers carry only a small reserve supply and have but little cash with which to purchase food in years of poor crops. With inadequate

transportation facilities, food prices are always very high in years of crop failure. In the North China region, therefore, where crop production is somewhat uncertain, the average farmer grows a variety of crops and does not put in so large a cotton acreage as he probably would if he lived in an area with a more dependable climate. If ample food supplies were assured, the Chinese farmer would undoubtedly be willing to grow proportionately more cotton.

An attractive price, nevertheless, induces farmers to plant cotton. The price of Chinese cotton is, of course, affected by supply and demand conditions in China. Since comparatively small quantities of cotton are exported at the present time, the demand is determined largely by the activities of the modern spinning mills in China. This demand, in turn, depends upon the market for yarn, which is affected materially by economic conditions in the country, such as favorable crops, level of farm prices, and stability of the Government.

In general, however, prices of Chinese cotton follow the trend of world prices. Prices of foreign growths at Shanghai are affected by changes in import duties and fluctuations in foreign exchange. For example, when Indian and United States currencies were devalued, prices of foreign cotton became cheaper in Chinese currency. In 1935, when Chinese currency was devalued, prices of foreign cotton became proportionately higher at Shanghai.

The Chinese Government, by raising the import duty on raw cotton from 42 cents per 100 pounds 4/ in 1929 to $1.72 in 1934, increased the cost of foreign cotton in China and thereby raised the price of domestic staple. During recent years, the price of Chinese cotton has followed rather closely the price of Indian Akola at Shanghai, with the Chinese staple usually remaining slightly below the price of Indian. When prices of Indian Akola at Shanghai become cheaper, cotton mills begin to buy Indian staple.

Marketing Methods and Market Centers

Marketing of cotton in China requires a great deal more labor than in the United States, and methods are relatively inefficient. Most of the ginning is done in the home during the fall and winter when there is little demand for farm labor, by means of a spike gin operated by the foot. Only in remote places is the seed separated from the lint by hand. Near some of the cotton centers, farmers sell their seed cotton to a central gin. The majority sell their ginned cotton to a local buyer, who, in turn, sells to a visiting middleman to ship to a concentration point or to a central market. Cooperative marketing has been undertaken by farmers in a few districts during the past few years.

4/ This includes import duty, customs surtax, flood-relief surtax, and conservancy fees.

FIGURE 3.- HOEING SMALL COTTON PLANTS JUST AFTER WHEAT HARVEST IN THE NANTUNGCHOW DISTRICT NEAR SHANGHAI. COTTON SEED WAS SOWN IN THE WHEAT FIELD ABOUT A MONTH BEFORE HARVEST.

FIGURE 4.- HOME SPINNING IS COMMONLY PRACTICED IN SOME SECTIONS OF THE INTERIOR.

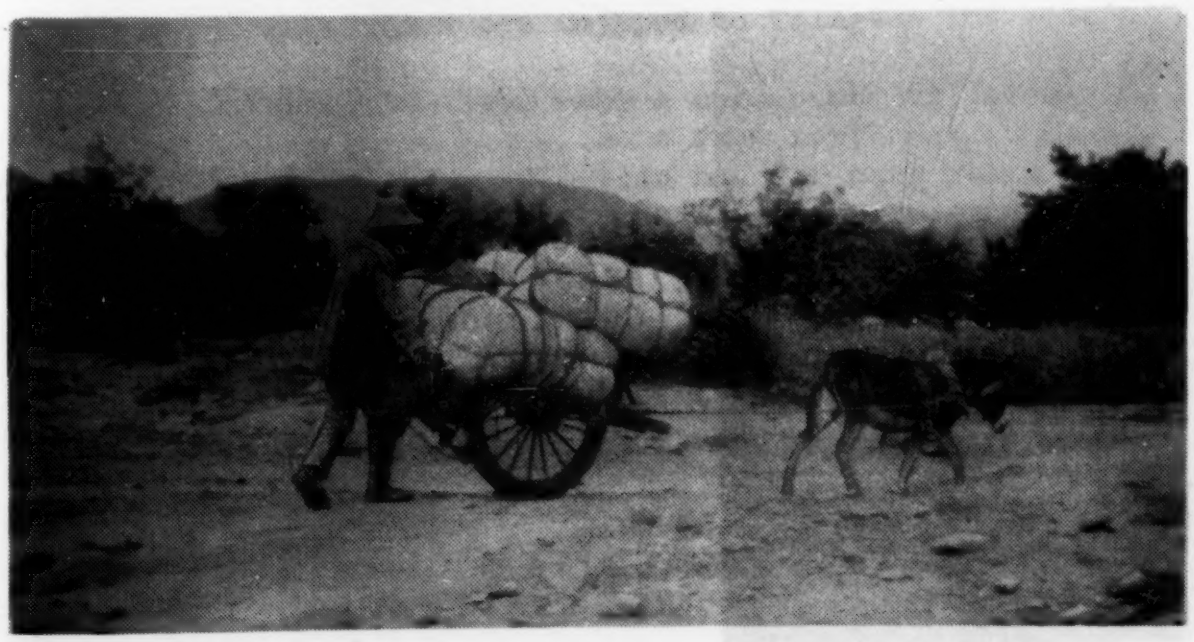


FIGURE 5.- MARKETING COTTON IN NORTH CHINA WHERE RAILWAYS AND WATERWAYS DO NOT EXIST. NOTE THE NATIVE BALES.

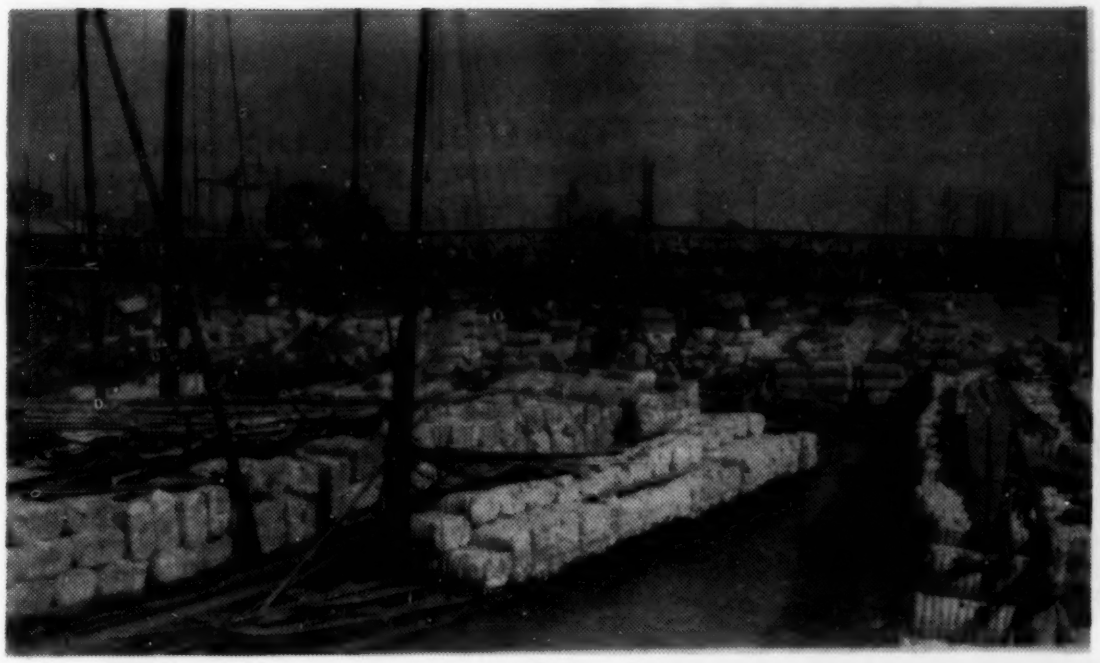


FIGURE 6.- NORTH CHINA COTTON ARRIVING AT TIENTSIN, A MARKETING CENTER.

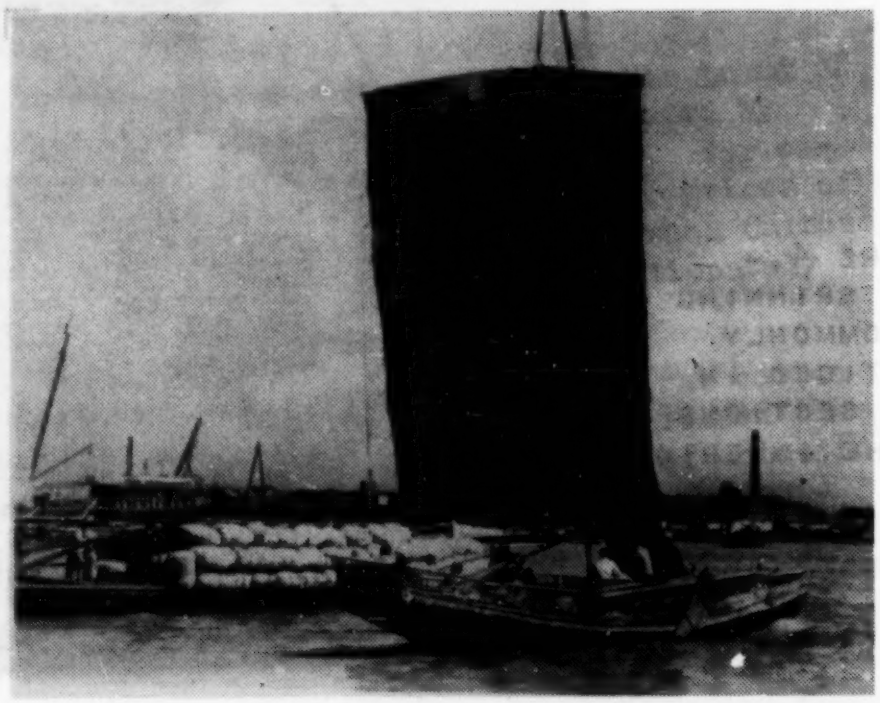


FIGURE 7.- YANGTZE VALLEY COTTON IN NATIVE BALES ARRIVING AT SHANGHAI.

FIGURE 8.- SHENSI COTTON READY FOR SHIPMENT TO CHENGCHOW, A MARKET CENTER.

After the cotton is ginned, it is tied up by a home-made press into a native bale varying in weight from 100 to 150 pounds. If the cotton is consumed in a nearby locality, it is sold to the mills in the native bales. Cotton produced in distant sections is brought to central marketing points, where it is usually resold, taken to modern presses for putting into bales of 300 to 400 pounds, and then shipped to the consuming centers.

There are five principal cotton-marketing centers in China; namely, Shanghai, Hankow, Tientsin, Tsinan, and Chengchow. At each center are several cotton dealers, who have large warehouses for storing cotton. Most of these dealers are financed by the leading Chinese banks.

Shanghai, which is the largest market, receives cotton from all parts of China. Fifty-two percent of the country's cotton spindles are located there. Prices paid at Shanghai usually determine prices paid at other centers.

Hankow is the market for cotton produced in the upper Yangtze Valley and receives a small amount by railroad from Honan and Shensi Provinces in the North China region. Hankow, having only six cotton mills, has a considerable excess of raw cotton. Several modern press packing plants located there re-press the surplus and ship it to Shanghai.

Chengchow, located at the junction of the east-west and north-south railways in Honan Province, is an important cotton center. A large percentage of the cotton grown in western Honan and Shensi Provinces is sold at Chengchow, where it is re-pressed before shipment to Shanghai, Hankow, or Tsingtao. Markets like Chengchow receive hourly radio cotton quotations from the Shanghai Cotton Exchange.

Tsinan, in Shantung Province, also located at a railroad junction, is a market for cotton produced in the western part of the Province. While there are three cotton-spinning mills at Tsinan, considerable quantities of raw cotton are shipped to Tsingtao and some to Shanghai.

Tientsin has long been a cotton market, receiving cotton from most of the districts of Hopei, some from northwest Shantung, northern Honan, and Shansi Provinces. Tientsin has for many years exported a type of cotton produced in Hopei and desired in foreign markets.

The cost of marketing cotton is high because of the many middlemen and the lack of adequate transportation facilities. This is especially true of cotton produced inland from railroads and waterways.

Quality of Cotton Has Improved

Chinese cotton has long been known for its short staple and poor spinning qualities. There are, however, many degrees of quality and lengths of staple grown in China, although there is no reliable information

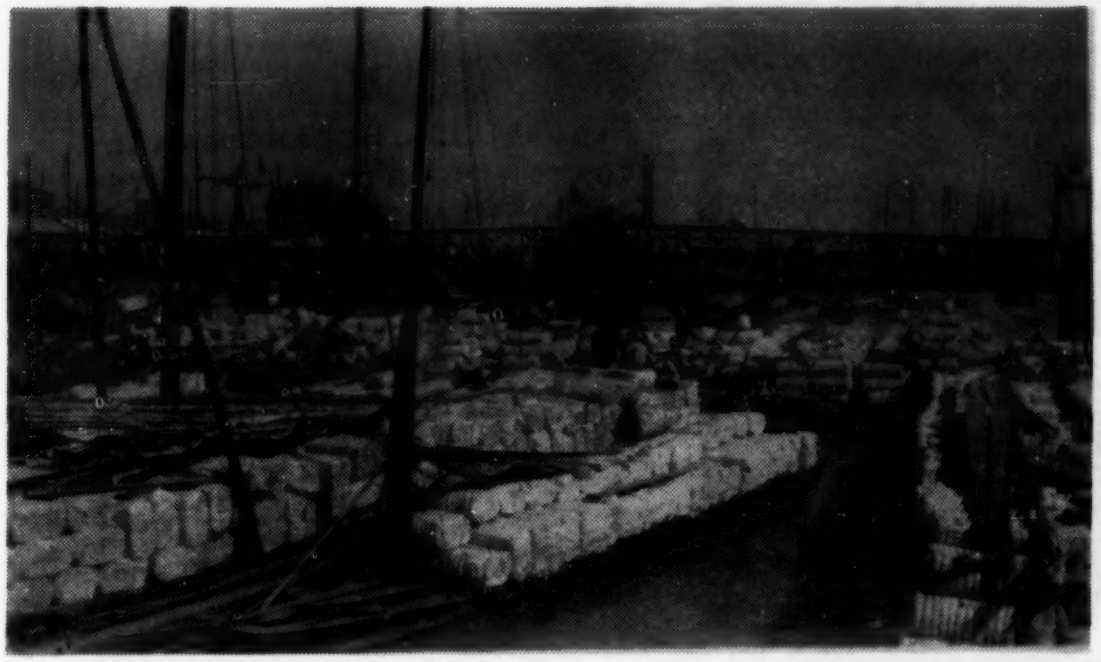
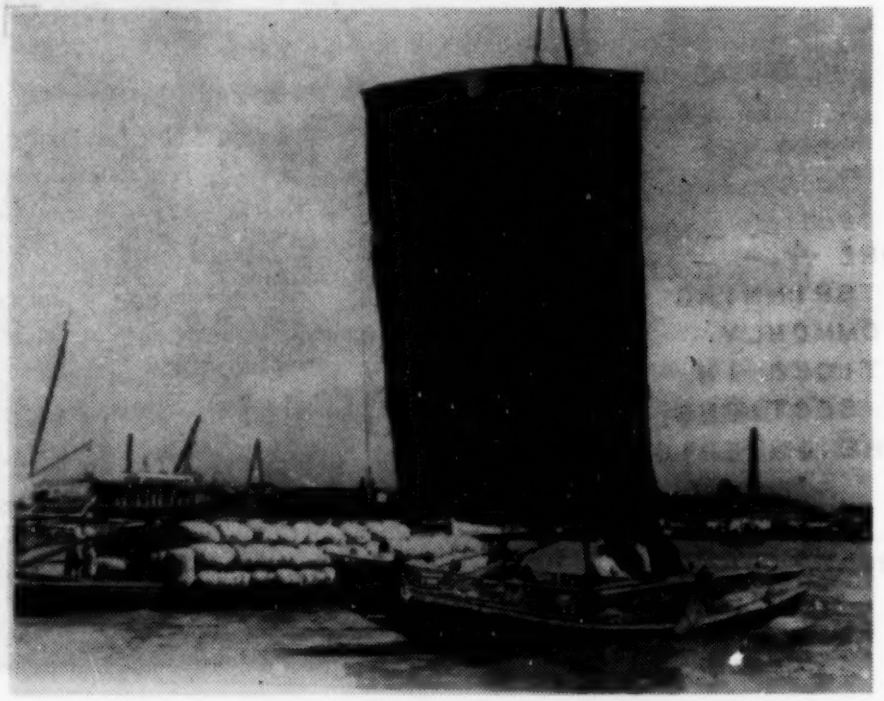


FIGURE 6.- NORTH CHINA COTTON ARRIVING AT TIENTSIN, A MARKETING CENTER.



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as to the quantities of the various grades produced. Staple produced from Chinese seed that has been native to the country for a long period is short in length, and until recent years, little effort has been made to improve Chinese cotton. In the last few years, considerable work has been done to improve the staple, and during 1937 cotton produced in China was used almost entirely for spinning yarn up to 40 count. A few years ago, most of it was suitable only for spinning yarn of 16 count and below.

In staple length, the bulk of native cotton produced is from 1/2 to 3/4 inch. The best native cotton produced in the Yangtze Valley is in the Nantungchow area and averages about 3/4 inch in length. The native staple of the Hankow area averages about 5/8 inch. Most of the native cotton grown in North China has been short in staple and of poor quality.

A type known as rough cotton has been produced in Hopei Province for many years in fairly large quantities. A small volume of rough cotton also has been produced in northeastern Hupeh Province. This type, about 1/2 inch in length, is wiry in character and has not been used to any extent by modern power spinning mills, except possibly for 10- to 12-count yarn. It has, however, been in demand in foreign countries for padding and for mixing with wool. At times it has commanded higher prices than improved American cotton in some of the world markets. The yield per acre of this type, however, is relatively low, and production has declined rather rapidly in recent years as farmers have shifted to improved varieties.

An improved staple has been grown for several years in northwest Honan and Shensi Provinces, which has been called German cotton. This cotton is from American seed introduced by German missionaries some 20 or 30 years ago. Although the seed has degenerated, cotton produced in this area is considered one of the best staples in China and is known as Lingpao.

Table 6. Samples of Chinese cotton classified by the Cotton Division of the Bureau of Agricultural Economics

Cotton-producing district	Staple length	Classification according to American standards
	Inches	
1. Lingpao, Honan.....	15/16 to 1-1/16	Middling Spotted Strict Middling Spotted
2. Shantung, American seed..	7/8	Good Middling Spotted
3. Shensi.....	3/4	Strict Middling Spotted
4. Tientsin, rough.....	1/2	"
5. Tientsin, American seed..	7/8	"
6. Nantungchow, Kiangsu....	3/4	Good Middling Spotted
7. Shanghai.....	5/8	Middling Spotted
8. Hankow.....	1/2 to 5/8	Strict Middling Spotted

Chinese agricultural experiment stations have for several years been growing American and improved Chinese cotton varieties and in the past few years have supplied farmers with increasing quantities of improved cotton seed. In North China, more extensive work has been done than in the Yangtze Valley. In several districts of Shantung Province, near Tientsin, and in central Hopei Province, the use of improved seed has resulted in a marked increase in production of staple 3/4 to 1 inch in length. Also in Shensi Province, the Government has been active in distributing improved cotton seed. The improvement work has been more noticeable in North China as a result of the expansion in acreage and the shift from the rough type to the improved staple production.

Table 7. Tentative Chinese cotton classes

Classification	Description	Staple length
1. Long staple American seed	All varieties possessing soft, fluffy, brilliant, silky appearance.	1 inch or more
2. American short staple	All varieties of improved staple.	3/4 to 1 inch
3. Chinese black seed	Native types of black seed, fine fibre, of creamy color.	5/8 inch
4. Chinese white seed	Native types of white seed slightly silky in appearance.	5/8 to 13/16 inch
5. Coarse fibre	Native type, slightly rough character, and white color.	1/2 to 3/4 inch
6. Extra-coarse fibre	Rough, harsh quality, dull white in color.	1/2 inch

Chinese Economic Journal, Shanghai, November 1934. Standards established by the Shanghai Bureau of Testing and Inspection.

Improved cotton seed has also been distributed to farmers in the Yangtze region, but to a lesser extent than in the north. Some improvement work has taken place in practically every cotton-producing Province in the Yangtze, the largest amount probably in Hupeh Province.

No statistics are available that indicate the amount of improved cotton being produced. In the Yangtze Valley there is a considerable quantity of approximately 3/4-inch staple being produced, but that above 7/8 inch in length is still quite limited. In North China, improved cotton with a staple length of 3/4 inch or longer is now being produced in several districts of Shantung and Hopei Provinces and in western Honan, but the annual quantity probably does not exceed 400,000 bales. The improved seed that has been distributed in recent years may, however, result in larger production of improved-quality cotton during the next few years, both in North China and in the Yangtze region.

Table 8. Staple lengths of Chinese cotton marketed at Shanghai a/

Staple length	Percentage of total	Staple length	Percentage of total
Inches	Percent	Inches	Percent
Under 3/4	0.8	29/32	7.6
3/4	16.5	15/16	7.1
25/32	29.2	31/32	2.4
13/16	20.2	1 or more	2.4
27/32	5.7		
7/8	8.1	Total	100.0

Chinese Economic Journal, Shanghai, November 1934.
a/ Based on tests made by the Shanghai Testing and Inspection Bureau from about 100,000 bales from the 1933 crop. These results were obtained by laboratory measurements and probably averaged slightly higher than if determined by commercial practice.

Domestic Consumption of Raw Cotton Increasing

The increased consumption of Chinese cotton and the decreased consumption of foreign cotton, directly and indirectly, in China during the past 18 years are more pronounced than the increased production. An examination of these trends brings out striking results in the loss of the market for American and other foreign growths. In 1921, modern spinning mills in China used about 1,000,000 bales of native staple, or 74 percent of the total consumed. During the same year, China imported 470,000 bales of raw cotton and, in addition, imported piece goods and yarn made from American and Indian growths approximately equal to 982,000 bales of raw cotton. In 1936, the spinning mills in China used 2,372,000 bales of Chinese staple, or 92 percent of the total consumption. China's imports of raw cotton in 1936 fell to 188,000 bales, and imports of cotton piece goods and yarn declined to an equivalent of approximately 44,000 bales of raw cotton. Thus the combined imports of foreign cotton and cotton textiles was equivalent to 1,452,000 bales in 1921 compared with only 232,000 bales in 1936. 5/

A large volume of Chinese cotton is still used for home consumption in China. In the remote places, spinning is still a home industry. A considerable quantity of raw cotton is used for padded garments and padded blankets. The total quantity used in home consumption has been roughly estimated at 800,000 to 1,000,000 bales annually. Since much of this cotton does not enter commercial channels, it is impossible to arrive at an accurate production figure.

5/ An article dealing with the development of the cotton-textile industry in China and its effects on the market for American cotton is in preparation.

Cottonseed is largely consumed within the country. In most of the heavier producing districts the oil is crushed from the seed. The oil is used largely for cooking purposes and the cake for fertilizer and, to a small extent, for feeding livestock. China for a number of years has annually exported from 60,000 to 150,000 short tons of cottonseed, the bulk of which goes to Japan. During the past 3 years, China has also exported small quantities of cottonseed oil.

Import and Export Cotton Trade

From 1920 to 1936, China was a net importer of raw cotton. Increased demand was created for suitable spinning cotton at the close of the World War by the construction of a large number of power spinning mills. During the period 1920 to 1936, the spinning mills more than doubled their output of yarn. This, in turn, required a much larger quantity of desirable raw cotton and made it necessary to import from India and the United States. The large raw-cotton imports in 1931 and 1932 were attributed to the low prices of foreign staple and the short Chinese crop of 1931. China was the fourth best customer of the United States for raw cotton during 1931-32, taking 12 percent of our exports.

Table 9. Chinese imports of raw cotton, average 1916-1920 to 1931-1935, annual 1931-1937

Period	United States	British India	Japan a/	Others	Total
	Bales	Bales	Bales	Bales	Bales
Average					
1916-1920.....	7,533	50,667	33,034	11,589	102,823
1920-1925.....	55,653	289,466	105,426	8,715	459,260
1926-1930.....	216,218	363,958	150,861	7,987	739,024
1931-1935.....	466,958	229,095	19,672	22,642	738,367
Annual					
1931.....	717,924	505,182	68,917	15,670	1,307,693
1932.....	865,370	126,535	24,807	20,814	1,037,526
1933.....	355,013	182,338	3,539	15,663	556,553
1934.....	269,232	233,201	727	33,855	537,015
1935.....	127,250	98,221	370	27,209	253,050
1936.....	43,428	94,825	0	49,417	187,670
1937 b/.....	11,392	27,448	0	31,804	70,651

Compiled from The Maritime Customs, Foreign Trade of China.
a/ Reexports, principally of United States and Indian cotton.
b/ Preliminary.

The Chinese cotton crop, which began to increase in 1932, has been sufficiently large during the past 2 years to reduce the demand for foreign growths to an insignificant amount. At the present time, only small quantities of American and Egyptian cotton are needed in China for spinning yarns above 40 count. Small quantities of Indian cotton also are

imported, generally when prices of equal grade at Shanghai are below Chinese staple. As long as the present import duty remains in effect, however, imports of foreign staple into China will probably continue to be small except in years of short Chinese crops.

China has been an exporter of raw cotton for many years; prior to 1920, exports had exceeded the volume of imports for more than three decades. The bulk of cotton exported during these many years was primarily of the rough type produced in North China and shipped from Tientsin. The principal market for this type was Japan, with small quantities exported to the United States and to Europe. The decline in exports reflects the decrease in production of rough cotton. Exports reached their peak in 1927, amounting to 403,000 bales, and by 1934 had fallen to only 96,600 bales. Since 1935, there has been a gradual increase in exports. While the shipments of rough cotton to the United States have increased recently, there has been an increase in staple suitable for spinning exported to Japan from both the Yangtze Valley and North China.

Table 10. Chinese exports of raw cotton, average 1916-1920 to 1931-1935, annual 1931-1937

Period	Japan	United States	Germany	United Kingdom	Chosen	Others	Total
	Bales	Bales	Bales	Bales	Bales	Bales	Bales
Average							
1916-1920.....	201,892	31,469	58	6,206	1,235	5,938	246,798
1921-1925.....	195,794	31,949	4,622	2,641	1,711	3,557	240,274
1926-1930.....	255,785	37,627	8,736	1,221	2,775	4,308	290,452
1931-1935.....	132,113	21,734	6,733	58	2,400	6,764	169,802
Annual							
1931.....	194,170	19,065	1,179	98	2,684	3,128	220,324
1932.....	137,054	30,732	6,874	540	2,581	7,230	185,011
1933.....	153,116	37,057	2,074	419	2,328	6,856	201,850
1934.....	76,881	10,285	2,855	209	2,340	4,012	96,582
1935.....	99,342	11,535	20,684	401	2,066	11,217	145,245
1936.....	119,207	33,502	8,011	542	5,532	3,129	169,923
1937 a/.....	108,074	43,774	11,409	308	4,564	7,994	176,123

Compiled from The Maritime Customs, Foreign Trade of China.
a/ Preliminary.

Factors Causing Recent Expansion in Production

As a result of all the work that has been done to improve and increase cotton production during the past 4 years, China has now become practically self-sufficient - both as to quantity and as to quality of raw cotton.

The increase of approximately 3 million acres in cotton during the period 1932 to 1937 has been accomplished largely through a shift

from other crops, as probably less than 5 percent of the increase has been on new land. An increase of 3 million acres planted to cotton would not appear large in the United States, but in China this amount of land diverted from food-producing crops means a decrease in the food supply at least equivalent to that required for 7 million people. During recent years, China has not increased imports of food but since 1934 has considerably reduced imports of wheat, wheat flour, and rice. Just what crops cotton has replaced is not definitely known, but it appears that they include kaoliang, soybeans, and, in some districts, peanuts. Three explanations have been offered for the adequacy of food supplies during the period of expanding cotton acreage: first, improved transportation has facilitated a freer movement of food crops from surplus areas; second, relatively peaceful conditions have prevailed in almost all sections of the country; and, third, favorable prices for farm products have stimulated more intensive cultivation.

It has been pointed out that cotton production has increased to the point where China no longer finds it necessary to consume annually more than a million bales of foreign cotton but is now growing a supply ample for domestic requirements at the present level of consumption. In order to have a basis for evaluating future possibilities, it is necessary to consider how this increased production has been brought about.

Encouragement by domestic agencies

Chinese cotton farmers have received encouragement, not only from their own Government and private agencies, but from foreign interests as well.

The most important single factor has probably been the raising of import duties on yarn, piece goods, and raw cotton by the Chinese Government. Between 1919 and 1934, the import duty on yarn was increased six different times. The import duties on piece goods were raised five times between 1929 and 1934, a total increase of 370 percent in less than 6 years. These large duty increases resulted in a tremendous reduction in the quantity of yarn and piece goods imported. During this period, the domestic milling industry was expanded and the demand for raw cotton increased. Annual imports of yarn and piece goods prior to 1920 were equivalent to more than a million bales of raw cotton, but in 1936 they amounted to less than 50,000 bales. Likewise, the National Government from 1929 to 1934 increased the import duty on raw cotton several times.

During the world depression, China developed a very unfavorable balance of trade. While the visible Chinese trade balance had been unfavorable for several decades, the trend became more pronounced after 1930. A number of important factors contributed to this situation. Overseas remittances by Chinese living abroad declined more than 50 percent; the devaluation of foreign currencies made it easier for foreign goods to

enter China; and the large Manchurian soybean export trade was lost after 1931. To counteract these developments, the Chinese Government raisedimport duties several times on practically all commodities between 1931 and 1934.

Another important factor influencing Chinese cotton production is found in the promotional activities of the Government. A program to improve and increase cotton production was started in 1931. In 1932, the Chinese Government set up the National Economic Council, the purpose of which was to improve economic conditions. One of the main activities of this organization was cotton improvement, which was to follow three main lines; namely, distribution of improved seed, increased credit facilities for cotton farmers, and improvement of marketing facilities. The National Cotton Control Commission was organized under the auspices of the Economic Council in October 1933 to carry on the cotton-improvement work.

The National Government established a central agricultural experiment station near Nanking in 1934, which also cooperated with the Provincial experiment stations on selection and distribution of cotton seed. An American plant breeder was employed for several years to assist the Federal and Provincial experiment stations in these activities.

The Government also set up Testing and Inspection Bureaus at several of the important marketing centers. One of the main functions of these bureaus was to test cotton offered for sale in an endeavor to improve the quality of cotton marketed, by reducing adulteration and moisture content.

In November 1935, the Chinese Government abandoned the silver monetary standard and adopted a managed-currency system. This increased the price of imported cotton and contributed to the rise in domestic farm prices. The competitive position of Chinese cotton as compared with foreign growths was improved, and an acreage expansion was thereby stimulated.

Cheaper interest rates to farmers through cooperative credit societies, sponsored directly and indirectly by the Government, assisted farmers in some localities to dig wells for irrigation and in some districts to market their cotton. The loan agencies often assisted members of the cooperative societies in selling their cotton. By eliminating several middlemen, the producer obtained a large percentage of the market value of his cotton.

The Provincial governments in practically all the important cotton-producing Provinces, the municipalities of Shanghai and Tsingtao, the leading Chinese banks, and the China International Famine Relief Commission also have aided in the cotton-improvement work and acreage expansion.

Japanese influence

The Japanese have shown an interest in cotton production in China for a number of years. Of the 5,100,000 spindles in China, 6/ approximately 40 percent are owned by Japanese. The Japanese mills are especially interested in improved cotton, as they spin a high percentage of the fine-count yarn made in China and produce an important quantity of the yarn and piece goods exported. Certain Japanese leaders have proclaimed on several occasions that they were interested in securing a source of raw-cotton supply for Japan near home, the purpose of which would be to replace as much Indian and American staple as possible. For instance, a Japanese monthly publication, The Oriental Economist, of August 1935, stated: "If China can be induced to grow cotton in such volume and quality as will meet the expanding requirements of Japanese spinning and weaving mills, the benefits accruing to both nations therefrom will be manifold."

The Japanese cotton mills and the Japanese Government have also been assisting in Chinese cotton-improvement work, particularly in Shantung and Hopei Provinces and Manchuria.

In Shantung Province, the Japanese cotton mills (there are nine large Japanese mills at Tsingtao) organized the Shantung Cotton Improvement Association. For 4 years this Association has been distributing American acclimatized cotton seed from Chosen, known as the King variety, to cotton farmers in eastern Shantung. In 1936 it was reported that 133,000 pounds of cotton seed were imported at Tsingtao.

Japanese industrial and agricultural experts have visited Hopei Province in North China several times in recent years. The South Manchurian Railway (Japanese-owned) now maintains a large office in Tientsin employing many statisticians and research workers engaged in studying general economic conditions, including the cotton-growing industry. Japanese interests have, during the past 2 years, acquired possession of several cotton mills in Tientsin. 7/

The Japanese have taken an active part in the work at the agricultural experiment station owned by the Peiping-Mukden Railway located about 20 miles northeast of Peiping. This station, consisting of about 50 acres, has been managed since 1934 by a trained Japanese agricultural expert and has been stressing cotton acclimatization and growing seed for distribution. One of the principal types of cotton grown at this station is from American seed that has been acclimatized in Chosen. It is

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6/ Since the beginning of Sino-Japanese hostilities in August 1937, several hundred thousand spindles at Shanghai and Tsingtao have been destroyed or damaged.

7/ From a report of the American Consulate General, Tientsin, September 2, 1936.

reported that the railway and Japanese interests each pay half of the operating expenses of the experiment station. How much of the improved seed has been distributed is not known, but American-type cotton can now be seen growing along the railways in several districts where native types were formerly raised.

In Manchuria, the Japanese army and the cotton-textile industry of Japan began an energetic cotton-improvement program in 1933. The Manchurian Cotton Producing Association was organized for the purpose of increasing cotton production from about 50,000 bales in 1933 to 400,000 in 1948. New cotton experiment stations were established, farmers were furnished seed, and marketing organizations were set up. Because of unfavorable weather conditions in 1934 and 1935, there were only slight increases in production. This confirmed the general opinion that climatic conditions in Manchuria are unfavorable for cotton production. As a result, the Japanese cotton industry lost interest, but the army has continued the program on a reduced basis and, after further experimentation, expects to develop cotton varieties more suitable to the Manchurian climate. An early estimate of the 1937 crop placed the production in Manchuria at 91,000 bales, but this figure will undoubtedly be revised downward because of heavy rains in the late summer.

Possibilities for Future Production

It has been pointed out that in the last few years China has reached a point of practical self-sufficiency in cotton production and thereby replaced over a million bales annually of American and Indian cotton formerly imported. This increase has been the result of a number of developments, including the imposition of import duties on raw cotton and cotton textiles, favorable cotton prices in relation to other crops, improved transportation facilities, and the crop-improvement program.

So far, the increase in production has resulted in practically eliminating foreign cotton from the Chinese market. In view of the growing desire of Japanese interests to obtain cotton from nearby sources, it is of particular interest to determine whether or not Chinese cotton production can be expanded further and thereby replace American and other growths in the other markets of the Orient.

Under certain conditions, such an expansion in Chinese production appears possible. Import duties imposed by the Chinese Government will not, of course, encourage production beyond the point of domestic self-sufficiency, but the other factors that have aided in bringing about the recent increase in production may be effective in expanding the production of cotton for export.

The competition for land that exists between cotton and other crops is particularly severe in China. Even where the price of cotton is favorable, a farmer may not grow it, because he is interested first of all in

assuring a sufficient supply of food. This is particularly true in regions where transportation facilities are inadequate. It is probable that an improvement in transportation facilities will be made. This may make it possible to bring foodstuffs into North China from the surplus food-producing regions of Manchuria and certain sections of North China and result in a further expansion of cotton acreage.

In addition to helping solve the question of food supply, improved transportation would in many places also reduce cotton-marketing costs. In many of the cotton-producing sections, the crop passes through the hands of a number of middlemen, each of whom moves the cotton along another stage to market. Better transportation and the resulting reduction in the number of middlemen would result in lower costs of raw cotton to the mills and possibly higher prices to the farmers.

On the other hand, improvement in the economic status of the Chinese farmer resulting from better transportation facilities might effect some increase in the domestic consumption of raw cotton, thereby reducing supplies available for export. Furthermore, should increased industrilization be developed in North China, a larger volume of cotton would likely be required for local consumption.

There are still certain areas in China where new land might be brought into use for the production of cotton. Some of these are located along the seacoast of Hopei Province and in the coastal region north of Shanghai. The reclaiming of this land, which will require a large amount of capital, would necessarily devolve upon the Government, and such a project is not likely to be undertaken for some time.

Even more uncertain are the possibilities of bringing new land into cultivation in northwestern China. Large areas of land are available in that part of the country, where the rainfall is extremely light and the growing season shorter than that of Hopei Province. Expansion of the crop acreage in this region would be dependent upon irrigation, for which water supplies are rather limited.

Some increase in the crop acreage in the Yangtze Valley might be made through large-scale drainage operations. Here again, however, it would be a question of a Government undertaking. Furthermore, in most sections of the Yangtze cotton region, rice is generally a more profitable crop than cotton, and it is not probable that more than a small part of any new land brought into cultivation would be devoted to cotton.

A continuation of the cotton-improvement work appears likely, once the current conflict in China is ended. The program has been primarily effective in improving the quality of the crop, but in the long run it should result in higher average yields. Production of higher-quality cotton would, of course, make the Chinese crop more competitive in the export market.

At the present stage of developments, Chinese cotton is more suitable for replacing Indian cotton than American. Little information is available with respect to the comparative advantages of cotton production in India and China. On the basis of general farming practices, however, and the much higher yields per acre in China, cotton production there is considered more efficient.

In conclusion, it is believed that, if an energetic program for expanding the acreage and improving the quality of the crop is continued, especially in North China, cotton production will exceed Chinese requirements. This cotton would be sold in other oriental markets, supplanting a certain amount of American cotton but offering stronger competition to Indian cotton. Uncertain rainfall in North China, however, will no doubt result in an irregular supply from year to year.

One of the most important questions in respect to future Chinese cotton production is the extension of Japanese influence in China. The purchase of Chinese cotton with Japanese currency not only would ease the Japanese foreign-exchange situation but would create a larger market for Japanese goods in China. As such developments occur, they may be expected to result in the utilization by the Japanese cotton industry of larger amounts of Chinese cotton, which would replace other foreign growths.

As long as military activity continues, however, cotton production will be materially reduced. Some Chinese cotton will probably be exported to Japan, because of the large number of cotton mills that have been closed in China.

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THE HOG INDUSTRY IN THE BALTIC STATES . . .

By Harry E. Reed*

Post-war agrarian reforms in the Baltic States (Estonia, Latvia, and Lithuania) were followed by the development of livestock production as the chief phase of Baltic agriculture. The large pre-war estates, interested chiefly in grain, have been changed into small owner-operated peasant farms with cattle and dairy products as the principal source of farm income. The closely related hog industry ranks second. Production of Wiltshire sides for the British market has become a leading objective of Baltic hog producers. The peak of the trade was reached about the time of the adoption by Great Britain of quantitative import restrictions on cured pork and was partially responsible for these restrictions. Other markets have been sought, and support of the industry has become a major government policy. Production is based on adequate domestic feed supplies and there is room for some expansion, but export outlets for pork are limited; consequently, a marked expansion would appear to be inadvisable and is unlikely.

The bacon trade with Great Britain has resulted in marked improvement in the type, quality, fecundity, and feeding ability of Baltic hogs. Standardization of pork products also has been advanced but has not succeeded in placing them on a favorable competitive basis with hog products from more important producing countries. Under clearing and compensation agreements, and the British quotas, Baltic pork products enjoy a certain amount of protection on foreign markets. It appears, therefore, that for the immediate future the outlet for Baltic pork products will be confined largely to those markets where such protection exists.

Imports of Baltic pork into the United States reached unusually high levels in 1936 and 1937, but did not exceed 3 million pounds, an insignificant contribution to total United States pork supplies.

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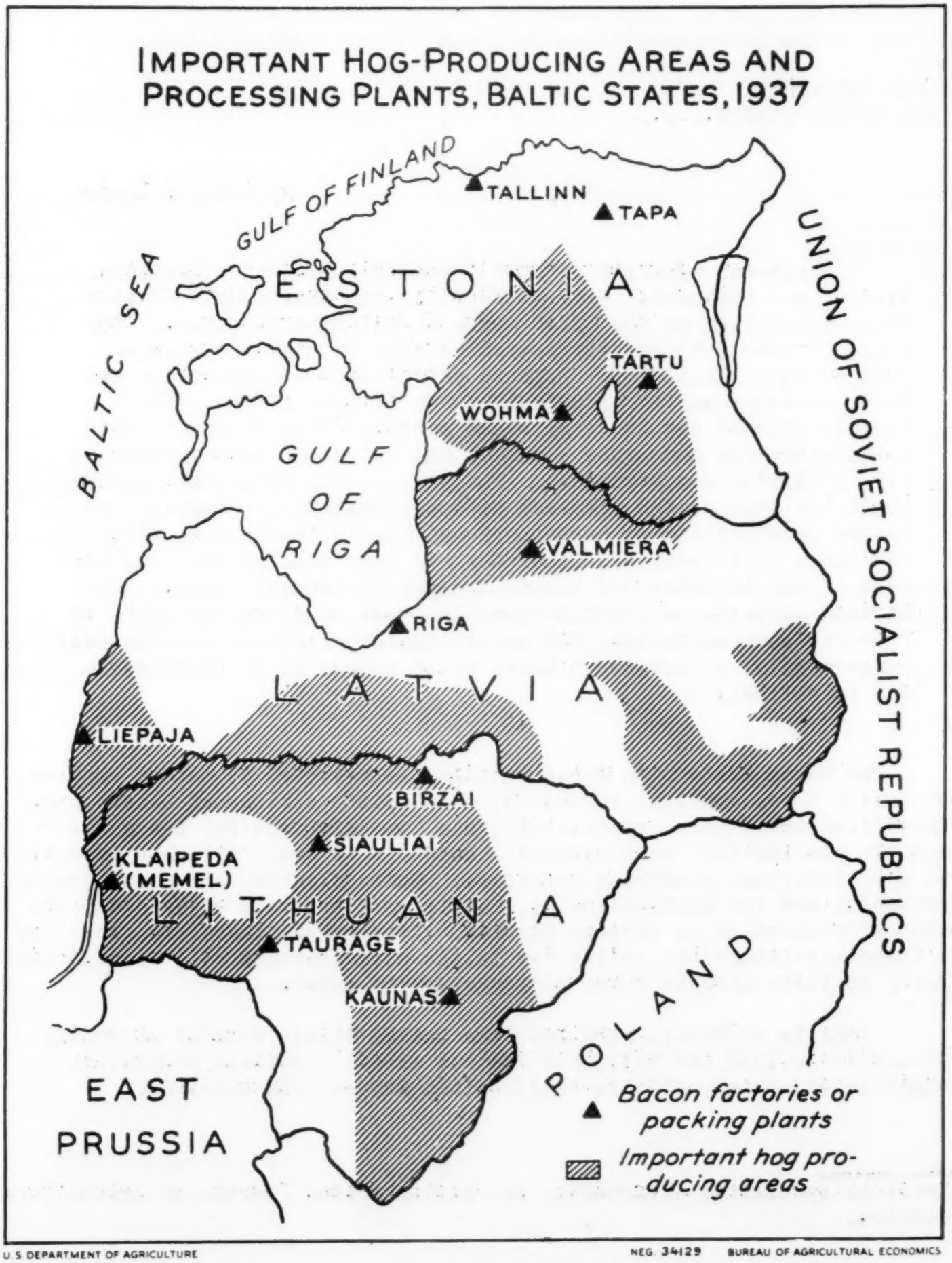
IMPORTANT HOG-PRODUCING AREAS AND PROCESSING PLANTS, BALTIC STATES, 1937
BALTIC SEA
GULF OF FINLAND
TALLINN
TAPA
ESTONIA
UNION OF SOVIET SOCIALIST REPUBLICS
TARTU
WOHMA
GULF OF RIGA
VALMIERA
RIGA
LATVIA
LIEPAJA
BIRZAI
SIAULIAI
KLAIPEDA (MEMEL)
LITHUANIA
TAURAGE
KAUNAS
POLAND
EAST PRUSSIA
Bacon factories or packing plants
Important hog producing areas
U.S. DEPARTMENT OF AGRICULTURE
NEG. 34129 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 1

Agriculture in the National Economy

The Baltic States are, and always have been, predominantly agricultural. Situated in the northern part of Europe between the Soviet Union and the Baltic Sea (see map on opposite page), these countries have climatic and soil conditions that favor the production of grass, root crops, and, to some extent, grains. They are also in possession of the principal ports on the eastern coast of the Baltic through which pre-war Russia carried on foreign trade. Near those ports certain industries were developed before the war, and finished goods were sent to inland Russian centers.

The great majority of the pre-war Baltic population, however, was engaged in agriculture, and in the immediate post-war years, when many industries closed for lack of markets, the new countries became even more dependent upon agriculture. In 1930, approximately 70 percent of the population of the three countries derived a living from agriculture and fishing. The majority of the remainder, who were not engaged in professions or in official or domestic work, were engaged in occupations closely related to the Baltic trade in agricultural products.

Prior to the war, about half of the land comprising present-day Estonia, Latvia, and Lithuania was held in the form of large estates. In Estonia and Latvia, most owners of the large tracts were of German origin; in Lithuania, they were largely Polish. Portions of the estates were leased to peasants and small holders, who were required to work on the estates proper for a certain number of days each year in payment of rent.

Despite the land reform that took place in Russia in 1905, land owned and operated by peasants in the Baltic States at the close of the World War amounted to only about 40 percent of the total area. In prewar days, most of the agricultural commodities entering trade channels were produced on large estates, inasmuch as small peasant owners had neither sufficient land nor time to produce much more than enough to meet their own needs. Rye, wheat, barley, and flax were the principal cash crops, and surpluses were shipped to consuming centers in Russia. Livestock did not play an important part in the agricultural economy; and, while some of the estate owners developed good herds of cattle and hogs, there was no great surplus of livestock or livestock products.

After the war, some of the first important measures adopted by the new Governments provided for agrarian reform. The large estates were broken up and many "new farmers" were established on the land. By 1930, the land reform, together with other post-war developments, had brought about the following division of farm land in the three countries.

Table 1. Area and Percentage of agricultural holdings in the Baltic States, 1930

Size of holdings	Estonia		Latvia		Lithuania	
	Percentage of total agricultural					
	Holdings	Land	Holdings	Land	Holdings	Land
Acres	Percent	Percent	Percent	Percent	Percent	Percent
Under 2.5	-	-	15.6	0.3	6.9	0.2
2.5 to 12.3	17.6	3.0	13.3	2.2	17.3	3.7
12.3 to 24.7	16.2	6.4	16.5	7.6	24.4	13.9
24.7 to 49.4	26.2	19.5	27.3	24.8	31.1	30.4
49.4 to 74.1	18.2	21.7	12.4	17.9	11.0	19.2
74.1 to 123.5	16.6	31.0	8.9	21.1	6.7	17.5
123.5 to 247.1	4.8	14.7	5.6	22.1	2.1	9.4
Over 247.1	0.4	3.7	0.4	4.0	0.5	5.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
	Acres		Acres		Acres	
Area of -						
Agricultural holdings.....	7,644,932		10,859,689		10,694,675	
Total land	11,174,358		16,257,648		13,756,595	

The First World Agricultural Census, International Institute of Agriculture, Bulletins 2, 7, and 10, Rome, 1936.

This basic structural change in Baltic agriculture during the decade following the war was responsible for other notable developments. Under the more intensive cultivation that accompanied the break-up of large estates, yields increased and land programs fostered by the Governments brought larger acreages under cultivation. Livestock and the exporting of livestock products were seen to offer greater possibilities for national income than the exporting of grains, particularly since Baltic grain does not have the most desirable milling qualities. As the interest in livestock became more widespread, an increasing proportion of the land was devoted to feed-crop production. By the early 1930's, livestock production, especially of dairy cattle, had become the most important phase of Baltic agriculture.

The Place of Livestock in Baltic Agriculture

In connection with their changed agriculture, the Baltic countries have adopted policies somewhat similar to those in Denmark, they include the marketing of grain and other crops in the form of livestock, and the exportation of livestock products. There are, however, certain fundamental differences between Danish and Baltic systems of livestock production.

In the Baltic countries, livestock production is less intensive than in Denmark; and, while great strides have been made in the post-war period, production is by no means so systematized and standardized as in Denmark. It should be noted, also, that a much smaller proportion of the products, especially pork, goes into commercial and export channels. Domestic feed supplies normally are ample for present livestock numbers, with export surpluses available in most good years, whereas in Denmark production depends to a considerable extent upon imported feedstuffs. Each of the Baltic states is larger in area than Denmark; and, since there are fewer animals to feed, a much larger percentage of the farm land can be devoted to meadows and pastures.

The cattle industry in the Baltic countries is directed toward dairy production and is based on hay and grass crops. Hogs are associated with dairy production and farming practices, since they utilize the skim milk, unmarketable grains, and potatoes. Because farms are small, the average number of hogs per farm in the three countries in 1930 varied from 2 to 4. There are few large operators. As many as 20 sows are kept by one owner only if he is producing purebred stock for sale.

Most of the hogs are in the hands of farmers whose holdings range from 12 to 125 acres. According to census data for Latvia in 1929 and for Lithuania in 1930, there was a definite relationship between numbers of milk cows and numbers of hogs on farms of these sizes, but not on smaller or larger farms. Farmers operating from 40 to 125 acres supply practically all of the hogs entering commercial channels. Farms over 125 acres in size tend to specialize in grain production. While most of them keep hogs, including a few sows, the hogs are consumed on the farms. Farms under 12 acres frequently have no hogs, and rarely more than one to two. These are usually bought as feeder pigs, fed out on whatever is available, and consumed by the farmer and his family.

Hog numbers and trends

Available hog census data and various estimates show that post-war hog numbers recovered to the pre-war level in a relatively short time. Additional increases have been reported in recent years in Estonia and Latvia, but declines in Lithuania have more or less offset gains in the other two countries. In June 1937, hog numbers in the three countries totaled 2,302,000 head, the second highest figure since 1931. Numbers in June of that year, at 2,603,000 head, were the largest on record. The increase in hog numbers was accompanied by an even greater increase over pre-war figures for cattle.

In all three countries, hog production has been encouraged in recent years by Government aid, notably in the export field. No serious effort, however, has been made to so increase hog numbers as to require

the regular importing of feed. Until the last few years, shifts in hog numbers appear to have been largely the result of changes in domestic feed supplies, principally barley, skim milk, and potatoes.

Table 2. Hog and cattle numbers in the Baltic States, 1914 and 1922 to 1937

Year	Hogs				Cattle			
	Estonia	Latvia	Lithuania	Total	Estonia	Latvia	Lithuania	Total
	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head
1914..	274	557	1,358	2,189	478	912	918	2,308
1922..	272	402	1,514	2,188	527	810	1,021	2,358
1923..	338	487	1,697	2,522	513	911	1,285	2,709
1924..	288	458	1,564	2,310	502	905	1,252	2,659
1925..	389	497	1,486	2,324	555	916	1,339	2,810
1926..	333	521	1,441	2,295	599	955	1,397	2,951
1927..	354	534	1,010	1,898	634	967	1,128	2,729
1928..	327	535	1,060	1,922	650	961	1,199	2,810
1929..	279	382	944	1,605	604	978	1,160	2,742
1930..	290	523	1,136	1,949	627	1,026	1,034	2,687
1931..	323	712	1,568	2,603	669	1,117	1,120	2,906
1932..	303	582	1,390	2,275	692	1,153	1,154	2,999
1933..	277	586	1,306	2,169	682	1,156	1,156	2,994
1934..	282	686	1,288	2,256	676	1,158	1,158	2,992
1935..	289	803	1,258	2,350	725	1,275	1,168	3,168
1936..	244	674	1,210	2,128	731	1,261	1,185	3,177
1937..	379	739	1,184	2,302				

In Estonia, for example, declines in hog numbers in 1928 and 1929 are attributed to poor crops, especially of barley, in 1927 and 1928. The increase indicated for 1937 probably would not have developed had the Government not supplemented the reduced 1936 grain crops with sales to farmers at low prices of mixed corn and barley feed carried over from previous years. Other features of official policy also encouraged more extensive breeding operations in 1937. Skim-milk supplies appear adequate, but the unsatisfactory 1937 harvests suggest the necessity for additional feed imports. In Latvia, increased hog numbers have been accompanied by larger domestic supplies of skim milk and feed crops, and practically no imports of feed have as yet been necessary. In Lithuania, the leading hog producer of the three countries, hog numbers declined from 1929 to 1936. As in the other two countries, hog numbers do not exceed normal domestic feed resources, and the maintenance of prices for hogs is expected to increase production.

Table 3. Barley and ptoato production in the Baltic States, 1925-1937

Year	Barley				Potatoes			
	Estonia	Latvia	Lith-uania	Total	Estonia	Latvia	Lith-uania	Total
	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels
1925.	5,289	8,169	11,251	24,709	23,872	27,574	58,091	109,537
1926.	6,039	8,662	11,430	26,131	34,020	37,238	61,160	132,418
1927.	4,335	5,974	8,630	18,939	27,253	26,358	46,444	100,055
1928.	4,211	3,275	6,910	14,396	18,412	11,539	35,263	65,214
1929.	5,687	9,548	12,286	27,521	27,669	39,674	68,082	135,425
1930.	5,893	8,605	9,278	23,776	31,714	40,568	64,649	136,931
1931.	5,917	8,808	11,085	25,810	31,398	42,881	73,346	147,625
1932.	4,607	8,849	10,975	24,431	28,762	44,281	70,503	143,546
1933.	3,731	8,955	10,647	23,333	34,871	51,535	58,742	145,148
1934.	5,276	10,001	11,663	26,940	32,780	53,124	91,606	177,510
1935.	4,216	9,398	11,556	25,170	32,801	53,688	65,175	151,664
1936.	3,939	7,580	10,700	22,269	37,868	59,210	77,572	174,650
1937.	3,765	10,032	11,353	25,150	33,663	65,476	92,196	191,335

Distribution of hogs and production practices

The extent to which the three countries encourage production of hogs varies in relation to the availability of domestic feed supplies. The larger number of cattle and larger production of feed grains and potatoes account for the fact that Lithuania is the most important as a hog-producing country. Estonia, with the most northern location, smallest land resources, fewest cattle, and lowest grain production, is the least important as a hog producer. Feed supplies also largely account for the distribution of hogs, as to both numbers and types, within each country. Proximity to markets is a minor influence with respect to the distribution by types.

In all three countries, skim milk and barley are the staple feeds for hogs, supplemented by varying amounts of unmarketable bread grains and potatoes. Skim-milk supplies are more than sufficient for feeding current numbers, and the tendency is to feed skim milk so heavily as to impair the quality of the bacon. Generally speaking, Baltic hogs are fed on products that otherwise would be wasted. Cost data, based on market prices of grain, indicate that in some areas hog production has been unprofitable in recent years. It is unlikely, however, that most feeds used for hogs would have any market value if offered for sale off the farm; the cost figure, therefore, cannot be regarded as representative

of usual conditions. Grass also has an important position in the hog ration of some Baltic producing regions, especially for young pigs.

In Estonia, the leading hog region is in the southern part of the country, adjoining the hog-producing section of northern Latvia. In this region the soil is more fertile, crop yields are larger, and dairying is further developed than in other parts of Estonia. Bacon pigs are pushed from birth and are marketed at 6 to 8 months, weighing around 185 pounds. Hogs for domestic use average about 220 pounds.

Severe winters and feeding conditions in Estonia are such that two litters a year usually are not attempted. Furthermore, few farmers own boars, but the rapid increase in boar stations (over 1,000 at present) may eventually affect the number of litters per sow per year. March, April, May, and June are the principal farrowing months, with a slight increase also occurring in September. The farrowing seasons are partly reflected in market receipts.

In Latvia, there are three sections contributing to the supply of hogs marketed through commercial channels in addition to the northern hog-producing regions adjoining that of southern Estonia. The eastern district borders on the Soviet Union and Poland, the southern district touches Lithuania, and the western district lies along the Baltic coast. These four regions include the most fertile Provinces in Latvia. The southern district, where the best fat hogs are produced, is particularly fertile. The best bacon hogs come from the northern district, where Latvian dairying has reached its greatest development. The northern region also has ample supplies of other feeds. In the west, proximity to the leading hog-exporting port has resulted in a dense hog population, with emphasis on fat types. The eastern section of Latvia raises the least improved hogs in the country. This section has a considerable trade in live hogs with the Soviet Union.

More fat hogs than bacon hogs are raised in Latvia, since the chief demand is for 220-pound hogs for domestic consumption. When bacon hogs cannot be marketed as such, they are retained and finished as fat hogs. With a milder climate and larger feed supplies, Latvia is able to follow a two-litter system more effectively than is Estonia, but fall farrowings are very small. Peak marketings of spring pigs come in October-December; fall pigs are marketed largely in April and May.

In Lithuania, the southernmost of the Baltic states and the largest of the three, hog production is relatively more important than in the other two countries and has a more general distribution. Production in the Memel district, bordering East Prussia, reflects a distinct German influence, and fat-hog production is the objective. A short type of Edelschwein predominates in this section. In other regions, bacon production is the principal aim, and Swedish Large Whites are preferred. About one-third of the hogs entering commercial channels are fat hogs for

domestic consumption. The other two-thirds are bacon hogs, destined for the British market as Wiltshire sides, and fat hogs for export as live hogs to the Soviet Union and Germany.

Grass, root tops, and skim milk, in that order, are the leading feeds in Lithuania. Grass is used to a much greater extent than in Latvia and Estonia, especially by farmers who keep hogs only for home use. Feed supplies in Lithuania are not so limiting a factor in hog production as they are in the other two countries, except in years of very poor crops. Feeds are never imported, and in most years feed grains are available for export. Feeds are rarely purchased for hogs.

Numerous boar stations have been established throughout the country in the hog-producing sections, and effective work has been done in getting farmers to adopt approved production and feeding practices. Progress, however, has been relatively slower than in the other two countries. March, April, and May are the principal farrowing months, but some increase in farrowings has been noticed from September to the middle of October. September-February is the period of heaviest marketings.

Types and breeds of hogs

A marked improvement in cattle and hogs has been an outstanding post-war development in Baltic agriculture. Prior to the war, some estates had developed cattle herds of fairly high production capacity, but those owned by peasants seldom were of an improved type. Hogs showed less evidence of breeding and selection than did cattle, except for a few estate-owned hogs and a few fat hogs in Lithuania, where there was a small trade going on with other parts of Russia and with Germany. In general, hogs were of unimproved, nondescript, or forest types, such as are still found in the marshy and wooded areas of eastern Poland. Shortly before the war, some attempt was made to improve hog stocks by crossing with the German Edelschwein and Veredelte Landschwein, but this movement was brought to an abrupt stop in 1914.

The post-war advances in dairy production have been especially remarkable. Considerable attention and Government aid was given the new small farmers as to breeding, selection, and improvement of animals. The best native cattle stock was used with a few imported cattle (mostly Black and Whites). Milk-control associations were established; cooperative dairies were organized; and herdbook societies were developed along lines followed in the Netherlands. Milk and butterfat yields and the conformation of the great majority of cows still compare unfavorably with those of countries long noted for dairying. When it is considered, however, that the cows are largely in the hands of small peasants and that they are maintained largely on grass and hay, comparisons with pre-war yields show a remarkable improvement. This improvement in dairy output has been an important factor in the improvement that has taken place in hogs.

Latvia and Lithuania were battle grounds during the war, and all three countries were fought over in the civil strife following the war. As a result, hog stocks were much reduced by the time reconstruction and agrarian restoration began. With Government aid, Large Whites, Danish and Swedish Landrace and Yorkshires, German Edelschweine and Veredelte Landschweine, and a few Berkshires were imported and crossed with the hardy native stock.

After several generations of crossing, producers in Estonia and Latvia have come to prefer Large Whites, while in Lithuania producers prefer Swedish Yorkshires for bacon production and a short-type Edelschwein for fat-hog production. Testing stations, breeding centers, and herdbook associations have been organized along Danish lines in all of the countries; several experiment stations conduct feeding trials and advise producers as to approved feeding practices; and many boar stations have been established with the aid of Government subsidies, where, for a reasonable fee, farmers can mate sows with approved boars.

The old unimproved types have been virtually eliminated, and in all three countries a good bacon- or meat-hog type predominates. While hog type is much more uniform than formerly, feeding methods still result in a great lack of uniformity in market hogs, especially among the numerous small producers. Perhaps the greatest measure of improvement in Baltic hogs is the appreciable export surplus, built up without a great increase in total hog numbers. In 1913, the hog population provided only domestic pork requirements at a time when living standards were very low. As a result of increased fertility and improved production practices, Baltic hogs now satisfy a greatly increased domestic demand as well as contribute materially to exports.

Government Aid in Marketing and Processing

Development of a marketing system in the Baltic countries has lagged behind the expansion and improvement in hog production. Since pre-war production was solely for farmers' needs, the post-war period started with little upon which to build a marketing system. Nearly all of the limited traffic in hogs was in the hands of traders, who bought from farmers and sold to butchers. Livestock markets were of little importance.

Such a system operating in a country of small production units, few markets, and inadequate transportation provided a worth-while service in getting surplus supplies to consuming centers. Competition between traders, however, was limited; with no other outlet for their products, farmers were forced to pay too much for the traders' marketing services. As interest in the bacon trade increased, cooperative and private bacon factories were established and the marketing of bacon hogs became more systematic. Producers of fat hogs and those who had other than bacon hogs to sell, however, were left to contend with the traders. Many farmers located near

cities undertook to butcher their own stock, selling their hogs on the city markets or to retailers after inspection by municipal veterinarians.

In recent years, monopolies have been formed to handle all phases of the export trade, including processing of the hogs. Operations have grown, with the monopolies participating in the domestic trade to an increasing degree. Buying points have been established, hogs are bought on a grade basis, and Government price-fixing policies are carried out by the monopolies. The monopolies have not been established long enough for their effectiveness to be fully demonstrated; but their operations to date, which recently have been aided by an increased foreign demand, have resulted in a general improvement in the marketing situation.

Estonia

After several years of experimenting with subsidies, equalization fees, and guaranteed minimum prices, Estonia formed a monopoly, in February 1937, for export processing and export of all livestock and meat products. The monopoly, known as Esti Likaeksport, took over the country's four cooperative export slaughterhouses, along with their capital, liabilities, contracts, etc., using a Government loan to liquidate the combined indebtedness. The monopoly buys hogs, both for processing and for export as live hogs, at most railway shipping points. Purchases are made through the monopoly's own agents, the time, place, and kind of hogs desired being advertised in weekly newspapers. Hogs offered by farmers are still lacking in uniformity of weight and finish. Since three markets are to be supplied - the British with bacon, the German with fat hogs, and the domestic with both meat and fat hogs - the monopoly accepts all that are offered and sorts them for different uses.

Price regulations effective in Estonia at present provide for payment of a subsidy to hog producers when the London price of Estonian bacon is less than 50 shillings per cwt. (about 11 cents per pound). Provision has been made for the subsidy to equal the difference between current hog prices and a price on a parity with 50 shillings, so long as the payment per hog does not exceed Ekr.10.00 (approximately $2.75). 1/ Subsidies are provided for, to be paid from a fund administered by the National Mortgage Bank and derived from taxes paid by export firms on all hogs processed for export or exported alive from Estonia. Actually, however, it has not been necessary to pay subsidies during recent years. Estonia's principal pork export is bacon to Great Britain, and British prices have been high enough to permit payment of hog prices higher than the minimum fixed by law.

Operations of the monopoly are increasing, and more and more pork products are being supplied to the home trade by the monopoly. Approximately a third of Estonia's total pork production enters commercial channels, 60 percent of which was handled by the monopoly during the first

1/ All conversions are made at current rates of exchange.

half of 1937. The remaining 40 percent was represented by hogs bought by butchers or killed by farmers themselves and sold in carcass form. With the monopoly handling the bulk of the trade, prices paid by it determine hog prices for all of Estonia.

Bacon and other meat-hog processing by the monopoly is conducted at three plants, Tallinn, Tartu, and Wõhma. Beside processing bacon for England and tinned hams and numerous other pork products for the home and export trade, the monopoly kills cattle and sheep for the home market and prepares sheep carcasses for export to Sweden. Little lard is processed commercially in Estonia, the monopoly rendering only unimportant quantities of fat by an open-kettle method. Live-hog exports, except for breeding stock destined for the Soviet Union, is a new business. Most live hogs are exported to Germany, shipment being made from Tallinn by boat. In addition to pork processed by the monopoly, supplies are furnished the home market by butchers and farmers, who kill at the several municipal abattoirs or present carcasses killed on their own premises for inspection at the abattoirs.

Latvia

Beginning in 1930, Latvia attempted to aid hog producers, first through a fixed-price system, then with subsidies, and later with a market-permit or card system. The results were unsatisfactory, and in 1935 a monopoly control of export processing and of all hog and pork exports was established and a fixed-price system adopted. Operation is through a joint stock company in which the Government controls the majority of shares and votes. The company, known as A/S. Bekona Eksports, has the sole right to process for export and to export live hogs and meats. It has taken over the cooperative bacon plant at Valmiera and private plants at Riga and Liepaja. Buying points have been established in the important hog-producing sections where Bekona Eksports buys direct from farmers through its own agents.

A fixed-price system has been followed since the monopoly was established. The price the monopoly is prepared to pay for a specified period is fixed and published. According to officials, the price is fixed at a level high enough to give producers a reasonable profit, and at the same time attempts are made to prevent undue hardships for consumers. Latvia grain and potato prices, however, are fixed at such high levels that a profitable price to producers requires that hog prices be kept at very high levels. Latvian hog prices, consequently, exceed those of neighboring countries, losses result, and subsidies are necessary. During the first year of operation, large (but unpublished) sums of Government money were used in maintaining fixed hog prices; in 1936, about Latos1,000,000 ($200,000) were so used; but in 1937 British bacon prices and export ham prices were so high that fixed prices could be paid without Government aid.

Fixed prices give farmers a satisfactory return on hogs marketed through the monopoly. Since the monopoly provides a market only for such hogs as it can dispose of, however, there is no assurance that farmers can market hogs at those prices. During periods of heavy marketings, producers are forced to dispose of the surplus to private butchers and traders, who buy at their own price, usually 20 percent or more under the so-called fixed price. During periods of reduced supplies and increased demand, such as occurred in the autumn of 1937, the monopoly pays higher than the fixed prices for hogs.

It is estimated that about half the total hog production enters commercial channels, the number varying between 300,000 and 400,000 annually. Usually about 160,000 a year are killed by farmers and sold in carcass form, about 40,000 are processed for bacon for Great Britain, from 20,000 to 80,000 are exported alive, and the remainder are handled by private butchers and the monopoly in home trade. Growth of monopoly operations in home-trade channels is aiding in the price situation, and during the last half of 1937 Bekona Eksports bought about 80 percent of all hogs offered. Some consideration has also been given to plans for the monopoly to take surpluses off the market as they occur and pack them against periods of shortages. During the peak marketing period of 1937, the monopoly had about 10,000 carcasses in storage.

Bacon for Great Britain is made at all three of Bekona Eksports plants, but principally at Valmiera. The plant at Liepaja is specializing in tinned hams at present, and the Riga plant is processing numerous pork and delicatessen products for home and export. The three plants have a capacity of about 2,000 hogs daily. Lard is made only at Riga, where a Danish centrifugal machine has been installed. Total fat supplies of the monopoly, however, permit operation of this machine only once a week. Live fat hogs for export to Germany are assembled at Liepaja from all parts of Latvia and exported by boat. Live hogs for the Soviet Union are shipped by rail.

Lithuania

In an effort to overcome marketing difficulties incident to the contraction in export outlets in the early 1930's, the Lithuanian Government adopted a card system somewhat similar to the one followed in Denmark. This system proved impractical and, after a period of experimentation with price fixing and subsidies, an export control was developed and a system of contracts between farmers and export processors was adopted.

Lithuania's price-fixing program and marketing agreements for hogs operate through "Maistas," a Government-producer-owned joint stock company, which has a virtual monopoly on exports of livestock and livestock products. The Maistas Company was first formed as a private company in 1922 to deal mostly in poultry and eggs. In 1925, it was sold to agricultural organizations but underwent little expansion until 1929, when low grain prices and

Soviet dumping of flax centered the attention of Lithuanian farmers and the Government on livestock exports. In 1929, the company expanded operations, built new plants, and engaged in an export-bacon trade. In 1930, it merged with a State-owned packing plant, came under Government control, was reorganized as a joint stock company, and gradually acquired a monopoly on exports of livestock and livestock products through the elimination of small processors who were unable to compete with a Government subsidized organization or to comply with the high standards imposed on export products.

Producers who sell livestock to Maistas are required to buy stock in the company, small deductions being made from payments for hogs to cover purchases of stock by producers. By 1937, Maistas had the largest number of shareholders of any joint stock company in Europe. In 1932, about Litu.16,000,000 ($2,720,000) of Government funds were needed to pay subsidies or cover losses, but the amounts needed for this purpose have declined rapidly. In 1936, 10 percent of the profits were placed in a reserve fund and a dividend of 6 percent was paid to shareholders; and 1937 was expected to be an even better year.

Farmers entered into individual agreements with Maistas as to the number of hogs to be delivered during 4-month periods. Prices, fixed in advance, presumably at levels that give farmers a reasonable return, vary slightly with the season of the year, the feed supplies, and the prices in export outlets.

As in Latvia, fixed prices do not carry with them an obligation on the part of Maistas to buy all hogs offered; and, when surpluses occur, producers are left at the mercy of butchers and traders. The situation in Lithuania has not been so bad as that in Latvia, inasmuch as declining hog numbers, the contract system, and expanding operations of Maistas in home-trade channels have tended to prevent the development of any great or prolonged surpluses. Attention is being given, however, to buying surpluses when they occur and placing them in storage.

From 600,000 to 800,000 hogs enter commercial channels annually. Of these, Maistas handles the bulk, its purchases in recent years averaging about 80 percent of the offerings. Usually about half of the hogs handled commercially go into home trade, the remainder being exported alive or processed.

Wiltshire sides for Great Britain and tinned hams and numerous other products for home and export are made at all points. Since the British import quotas became effective, fat-hog production has increased, and about one-third of the total receipts are fat hogs, i.e., bacon hogs fattened to lard weights. As a result, the manufacture of lard increased and received considerable encouragement in 1936, when trading with Germany was resumed. Lard is rendered by open kettle; there are no facilities for

processing as prime steam lard. Live hogs are assembled at Klaipeda for export by boat to Germany. The export of live hogs to the Soviet Union is a long-established trade and is conducted by rail.

Disease Control

All of the Baltic countries have laws requiring inspection of all meat offered for sale for human consumption, and a veterinary control is exercised over all meat and livestock exports. Farmers are required to report all disease outbreaks within a specified time. At packing plants and municipal abattoirs, inspection service is provided; and meat killed on farms or on butchers' premises must be presented for inspection and passed before being sold. Most attention seems to be given to the detection of trichinae, even though very few cases have been found in recent years. The most serious hog disease in the Baltics is swine erysipelas. This seems to be increasing rather than diminishing, especially in Lithuania, where reported cases in 1936 were more than three times those of 1933.

Dietary Habits and Domestic Consumption

Pork has always been the most important meat in the diet of Baltic people and, as has been shown, the greater part of hog production is for the purpose of supplying domestic meat requirements. Beef is consumed principally in the cities, very little being used in rural areas. Data showing consumption of pork in Baltic countries are not available, but it appears that pork consumption must be very elastic, varying with changes in production and purchasing power of consumers. It is likely that, of the three countries, per-capita consumption is greatest in Estonia, where living standards are highest, and lowest in Lithuania.

Fat rather than lean pork is preferred by consumers in all three countries. It is probable that average slaughter weights for hogs for domestic consumption approximate 220 pounds. In the cities, pork is consumed mostly in fresh form, but on farms and in rural districts much of it is salted and some is smoked. Little lard is rendered either for the urban trade or for farm use, those who use pork fat preferring it as meat, cooked with vegetables, etc. Rendered lard, mixed with onions or herbs, is used as a spread. While an increase in consumption of pork in all three countries is possible, the probability of it is remote.

Hog and Pork Exports

An important part of the stimulus given to expansion and improvement of hog production in the Baltics came fron bacon-export possibilities to Great Britain in the latter half of the 1920's. It appears that Estonia was the first to enter this trade, minor quantities being shipped to England in 1925. Latvia began shipping bacon in 1926, but Lithuania sent none until 1928 and no important quantities until 1930. Annual bacon

exports from the Baltics during the period 1925-1932, while very irregular, showed a rapidly increasing tendency. Bacon exports have declined with the adoption by Great Britain of import quotas on bacon and other cured-pork products and subsequent reduction in those quotas, there being no other important outlet for the type of bacon that the Baltic countries produces.

Table 4. Exports of bacon from Baltic States, 1925-1937

Year	Estonia	Latvia	Lithuania
	1,000 pounds	1,000 pounds	1,000 pounds
1925	940	-	-
1926	3,053	6,708	-
1927	5,739	8,748	-
1928	4,254	3,410	330
1929	2,871	1,758	696
1930	2,627	3,928	9,048
1931	6,824	3,894	40,028
1932	8,677	2,141	55,405
1933	7,271	5,119	47,125
1934	5,789	4,974	27,944
1935	4,892	3,865	18,971
1936	4,967	4,209	22,636
1937.(8 months only)	2,968	2,795	13,620

Data for 1925-1932 represent net exports as compiled by the International Institute of Agriculture, Rome. Data from 1933 on represent gross exports and were obtained from the American consulates in the respective countries.

Estonia has been granted permission to supply 0.75 percent of Britains's foreign quota, Latvia 0.70 percent, and Lithuania 2.95 percent. (The United States share is 8.1 percent.) Like all other European countries participating in British bacon-quota allocations, the Baltic countries have not been able to make long-time plans for the future because they have never known what tonnage could be shipped to England for more than a few months ahead. In addition to quota shipments of bacon, Lithuania, along with Denmark and Poland, carries on an important reexport trade in bacon through British ports, most of the supplies going as ship chandlers' stores or to countries in the Mediterranean area.

There is nothing about the quality of Baltic bacon to make it particularly attractive to the Britsh consumer. Baltic bacon has undergone considerable improvement in recent years but cannot yet compete on a quality basis with Danish, Netherlands, or Swedish bacons. British import restrictions have a protective effect on prices of all descriptions of bacon, and the Baltic product has received the full measure of that protection. For example, in September 1937, when supplies were reduced and British prices for bacon were at the highest level in years, Baltic bacon sold at

100s. per cwt., 6s. less than Danish; while in September 1932, when supplies were not restricted and prices were low, Baltic bacon sold for 56s. per cwt., 10s.9d. less than Danish.

Exports of pork, ham, and lard from Estonia and Latvia have never been of importance; in fact, these countries were on an import basis for lard until 1928. Lithuania had a farily regular export trade in pork, mostly carcasses, averaging about 6,600,000 pounds a year up to 1936, when larger exports to Germany and Belgium increased this trade. Until 1931, Lithuania was also a net importer of lard, but since that year lard exports have increased.

Table 5. Lithuanian lard exports, 1933-1937

Country	1933	1934	1935	1936	9 months 1937
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Germany	295	326	7	316	374
Czechoslovakia	10	-	-	367	56
Soviet Union	251	-	-	-	-
Switzerland	-	-	11	-	-
England	-	-	4,487	3,777	1,082
Others	-	-	159	390	-
Total	556	326	4,664	4,850	1,512

American consulate, Kaunas.

Live-hog exports have been an important trade for Lithuania, but never for Estonia and only during the last 2 years for Latvia. In 1935, Lithuania ranked fourth among live-hog exporting countries in Europe, being exceeded by Yugoslavia, Hungary, and Poland. Settlement of political difficulties with Germany in August 1936 permitted a marked increase in live-hog exports to that country. Latvia, by reason of a trade agreement, sent large numbers of hogs to Germany in 1936, taking first place as a source of live-hog supplies for Germany. Slaughter-hog exports to both the Soviet Union and Germany consist of fat hogs, usually weighing 285 pounds or more. Some of the live-hog exports to the Soviet Union are of breeding stock. While the export trade in live hogs is of long standing, it has always varied greatly from year to year and is not a dependable or well-established trade.

Looking Ahead

While great developments and improvements have taken place in the livestock industry of the Baltic states in the post-war period, the industry is not yet in a position to compete in export outlets on a price-quality basis with more advanced livestock-producing countries. Nor are there particular production advantages in the Baltics, other than large

supplies of dairy byproducts, that would suggest the likelihood that Baltic hog products can materially improve their competitive position. Expansion in hog production is entirely possible. From the standpoint of feed supplies, Lithuania has the greatest possibilities for increased production and Estonia the least. Expansion toward a point where feed imports would be necessary is unlikely, however, because heretofore the quality of Baltic pork products and the demand for them in export markets have not been such as would justify the importation of feedstuffs.

Equal in importance to domestic feed supplies as a limiting factor in Baltic hog production is the problem of market outlets. Expansion of the British outlet on a scale that would justify increased hog production is problematical. The market in the Soviet Union is equally uncertain. Germany appears to be the country most likely to increase imports of Baltic hogs and pork. The Baltic countries need, and are natural outlets for, German industrial goods. In turn, Germany needs Baltic meat and fat supplies; and, after the unsatisfactory development following Germany's excessive hog production of 1936-37, it appears that Germany's policy will be directed more and more toward importing hogs and pork products, particularly if they are obtainable from countries that will accept German industrial goods in exchange.

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IRAN ADOPTS POLICY OF NATIONAL PLANNING

On November 16, 1937, the Iranian Parliament approved a law designed to improve and regulate the agriculture of the country in conformity with principles of national planning, according to American Consul James S. Moose, Jr., at Teheran. The principal objective of the law is to secure maximum crop yields. In order to accomplish that objective, it appears that landowners and cultivators will be obliged to make any improvements that the authorities deem necessary or advisable.

The law provides that all proprietors of agricultural land will be obliged to develop such land so as to obtain maximum yields. This is to be accomplished mainly through the construction of new wells for irrigation and the repair of old wells, the reclamation of waste land, and the adoption of improved agricultural practices. Construction and remodeling of peasants' homes along hygienic lines and the building of roads are also provided for.

The local council of each canton or district is authorized to prepare a program of needed improvements, and the same is to be put into execution after approval by the Governor of the Province in which the canton is located. The expenditures incidental to such improvements are to be shared by the proprietors of each canton where developments are inaugurated.

The law also provides that, in the event the proprietors of the land do not have sufficient funds to carry out the needed improvements, the program may be financed through Government loans. It is also stipulated that the land of those who have sufficient financial resources but who refuse to use their money to put needed improvements into effect may be taken over by the local council or by agricultural development companies.

Under the law, the Department of Agriculture will set up an agricultural program for the entire country. If anyone objects to the cultivation of certain crops on grounds of unsuitable climate and soil, he is to present his complaints to the local council. The latter will submit a report to the Governor of the Province, who will refer the same for final decision to a Provincial Council. The decisions of this council are final. The Department of Agriculture is authorized to give prizes to proprietors and farmers who outstrip others in improving agricultural land or the farm products grown.

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YUCATAN ESTABLISHES NEW HENEQUEN CONTROL AGENCY

An association known as the Henequen Planters and Producers of Yucatan, with sweeping powers to control and regulate the henequen industry of that State, was established by an executive decree of the Governor of Yucatan on February 11, 1938, according to a report just received in the Bureau of Agricultural Economics from American Vice Consul C. H. Taliaferro in Merida, Yucatan. The new agency is to replace the organization known as the Cooperative Association of Henequen Growers of Yucatan, Limited. The latter, according to the decree, was to cease its activities on March 1, 1938, and its affairs are to be completely liquidated by March 1, 1940.

In that connection, a supplementary decree was issued February 11, 1938, giving complete details as to the purpose and duration of the new association, its financial activities, the requirements for admission of members, the powers of its board of directors, and the methods of distributing profits.

According to this supplementary decree, the association will enforce regulations relating to the planting, cultivation, decortication, and packing of henequen; determine the amount and price of the fibers to be furnished to the local factories; exercise control over the local manufacture of henequen products and over the sale of henequen in foreign markets; make loans to members for the development of production; make and sell equipment for the manufacture of henequen products; establish a fleet of ships for a better distribution; exploit and open foreign markets; and maintain a statistical service.

In addition, it has special functions relating to the advancement of the social welfare of those engaged in the production of henequen. In that connection, it is authorized to sell life insurance policies to growers and to establish a school in the city of Merida for the education of growers. The money for financing such welfare activities is to be contributed by the Federal Government from funds established by an export duty on henequen fiber.

The minimum capital of the new association is fixed at 10,000,000 pesos ($2,775,000). This is to be contributed by the members over a period of years under a sliding-scale arrangement, whereby a certain amount is deducted annually from the general average net returns on all sales effected, the actual amount of the assessment varying in accordance with the average price obtained.

The direction of the association is entrusted to a board, consisting of a president (the Governor of the State), a vice president (appointed by the Governor and functioning as executive manager), and ten directors.

Six of the directors are to be elected from the "comisarios de ejidos" (collective or communal lands), two from the Union of Medium or Small Henequen Producers, and two from the Union of Henequen Producers. The president and vice president have the right to veto any decisions of the board that in their opinion are detrimental to the interests of the Federal or State Government.

In order to qualify as a member of the association, a grower must be producing at least 200 kilograms (440 pounds) of fiber annually, bind himself to deliver his entire crop to the association, and be duly registered. In return, he has the right to share in the profits of the association (settlement being made at the end of each calendar year) and to receive at the time of delivering his fiber such advances as may be established by the board of directors.

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NYASALAND REQUIRES AUCTION MARKETING OF TOBACCO

A tobacco-marketing law enacted in Nyasaland on December 21, 1937, provides that all flue-cured and most of the fire-cured leaf grown in the country must be marketed through licensed auction warehouses, according to a report from the London office of the Bureau of Agricultural Economics. The purpose of the law is to bring about more economical and orderly marketing. Two auctions will be in operation for the current season's crop, one at Limbe and the other at Lilongwe.

The administration of the act is in the hands of the Tobacco Control Board, consisting of three growers, two export buyers, two members of the Native Tobacco Board, and a representative of the Department of Agriculture. This board is authorized to license all growers, buyers, and warehouse owners and to require buyers, exporters, and warehouse owners to make periodic returns on their transactions.

Of special significance is the fact that the board is empowered to fix a minimum price below which no class or type of tobacco may be exported. For flue-cured leaf, this minimum price will probably be around 1.5d. (3 cents), according to the report. The board also has authority to fix auction charges for weighing, selling, and commissions.

According to the act, no tobacco may be exported without a written permit from the board certifying that its price is above the minimum. Upon special authorization of the board, sales may be permitted by consignment from the grower direct to a dealer in England, provided the leaf in question has been appraised to establish that its value is above the fixed minimum.

The board is authorized to establish a pool to receive and sell tobacco for which an export or domestic sales license has been refused. It may purchase tobacco either for sale in foreign markets or for purposes of exhibition in those markets. It may also incur expenditures for the furtherance of any plans to improve marketing facilities and to develop overseas markets.